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TABLE OF CONTENTS ON LAST PAGE OF READING.

THE METRIC MENACE.

FORCEFUL AND EMPHATIC are the arguments presented by representative American manufacturers to the Committee on Coinage, Weights, and Measures of the United States House of Representatives against the introduction at this time of metric legislation. There is neither urgent need nor widespread demand, it is contended, for any such radical change; and what agitation there is for measurement with decimal units is fostered rather by academical enthusiasts than practical producers and thoroughgoing trade builders. While the metric system, in itself, is unobjectionable and, indeed, like our American decimal coinage system has much to commend it, its introduction at this time would be inopportune; and such a "reform" might be very hurtful to many American industries.

One prominent manufacturer says that the adoption of such a system would mean the spending of millions of dollars and the injection into American business of more confusion than could be overcome in a generation. Indeed, he says such a change would be little less than a commercial calamity. That the introduction of such a sweeping change in standards would slow up production at a time when greater output than ever is needed is self-evident; and if for no other reason our national lawmakers might well postpone action on the proposed metric legislation.

An automobile concern which exports to all parts of the world a large part of the $60,000,000 worth of vehicles produced by it annually, freely states that it has in no way been adversely affected by the use of the current standards of length, weight, etc. Other large concerns testify that not only do they suffer no disadvantage in making extensive foreign sales, but were they compelled to adopt the metric system they would positively lose hundreds of thousands of dollars a year and might even be forced out of business.

Objection is made, too, to the unnecessary and expensive hearings on the subject on which a vast amount of data is available in America and England; and to coercing manufacturers into adopting a system which they may under existing laws accept voluntarily whenever such course is plainly to their advantage. As over half of the export of America's manufactured goods is bought by English-speaking people, all of whom use the inch standard, plainly it would be more to the advantage of the United States to act in concert with other countries using the same standards of measurement in any scheme for improvement than to "go it alone." Alert foreign rivals might easily reap a huge advantage while America would be making a troublous change.

WHAT MACHINERY HAS DONE FOR RUBBER.

THAT the business of the twentieth century is founded upon labor-saving machinery as much as upon labor, and even more, is a fact. To catalog the many steam and electric machines and tools that do what the workman once accomplished would be in itself a great task. Not only do they spare and supplement labor, they save time, and materials, decrease working hours, increase the productivity of working hours, cheapen the cost of articles, increase the consumption of commodities and bring comfort to millions.

Charles P. Steinmetz in "America and the New Epoch," says: "One hundred years ago the average workday was ten to eleven hours. Now it is eight to nine hours. It has decreased about 20 per cent. The productivity of work in these 100 years, by the steam engine and the number of inventions and improvements following it, has increased at least tenfold—probably more nearly twenty to thirtyfold—but for illustration let us assume only a tenfold increase. Thus with an average of one hour's work during the day we could now produce as much as we did in ten hours, a hundred years ago."

This is just as true of rubber as of any other industry. The mixing batch of the days of Goodyear on a small belt-driven mill gave a product of forty pounds an hour. The ninety to a hundred pound batches on the modern high-speed mill easily produces four or five hundred

pounds in the same time, or if the mixer handles two mills, twice as much.

Along the line of time saving is the vacuum dryer for washed rubber. Three hours does what air drying took three months to accomplish. (Some of the ultra conservative let Pará rubber hang a year to dry and "age".)

These are but two of hundreds of instances applicable to all lines of rubber manufacture. Nor has this sort of progress reached its limit. Particularly in tire manufacture scores of special machines are created every month. Verily the debt of the rubber trade to the inventor and mechanical engineer is a big one.

LOOKING AHEAD IN CRUDE RUBBER.

ONE of the most far-sighted of the big rubber manufacturers predicts a shortage in crude rubber by 1924. He bases it upon the present production of rubber plus the increase figured on past experience. Against this he puts the constantly increasing use of rubber, chiefly in automobile and truck tires. This should not give pause in tire manufacture but should lead to provision for more crude rubber. Indeed it probably will result in greater planting areas in the Far East and possibly in the Philippines.

Again comes up the thought of rubber within our own borders. The work that is being done in the guayule propagation is of this sort and deserves and will probably win success. There should be, however, constant work upon other producers, if possible of native origin. The fact that wild *Chrysothamnus nauseosus*, which is so abundant in the mountain regions of Western North America, showed 6.57 per cent of rubber argues at least 10 per cent under selection and cultivation. If only rubber enterprise, backed by rubber money, would take up this very promising lead it would be most gratifying and probably successful.

THE FACTORY TRAINING SCHOOL.

A STRIKING OBJECT LESSON to industry is the training school for executives and salesmen maintained by the Westinghouse Electric & Manufacturing Co. For years it has been conducting such an educational institution on a constantly broadening scale and with marked benefit to the men and advantage to the company. The students for the courses are selected from among technical graduates of leading schools and colleges, about 450 being enrolled for the 1920 classes. After a year of intensive instruction the students are given positions in various departments. They come from all parts of the world and many return home as foreign representatives of the concern.

Not the least important part of the system is the training of the machinists' apprentices, the course being available for any boy of sixteen who has had a fair schooling. The key-note of the system is "broad training and education and later specialization." The company spares no expense in providing competent instructors, class-rooms equipped with the most perfect material and the highest grade machinery, and in striving to make the courses interesting and thoroughgoing. The boy who completes the four-year term is assured a permanent position and is able to operate any machine in the works, an accomplishment hitherto possessed by scarcely two per cent of the mechanics of the country.

RUBBER PATENT LEATHER WANTED.

AMERICAN MANUFACTURERS of glazed kid or patent leather extensively used for fine shoes are worried over the action of India in levying a 15 per cent tax on all raw skins exported to countries outside the British Empire. They claim that it sounds the death knell of the glazed kid industry in the United States, and the transfer of the manufacture to the Canadian shops. These have the advantage of a 10 per cent rebate of the tax, as the Dominion is part of the British Empire, and can therefore undersell the United States product. As the Indian tax amounts to $3 a pound, and as American manufacturers import from India 42 per cent of the raw skins used, a sure result will be higher prices for shoes and leather goods. Apparently the sole recourse would be to supplant glazed kid as far as possible with some rubber-coated fabric made to resemble the expensive leather article. Rubber will be equal to the occasion if called upon, nor will it be the first time that it has stepped into the breach, and with an adequate substitute either saved a threatened industry or at least averted a certain loss in trade.

NO PHANTOM OF HOPE, NOT EVEN THE SECRET OF perpetual motion or the transmutation of base metals into gold, has been pursued more eagerly than the solution of the problem of the non-pneumatic resilient wheel. Among the hundreds of American tire patents issued yearly is always a fair sprinkling of patents for rubber tire substitutes, generally in the form of metal springs to be set around the wheel hub, in the spokes, or in the rim. Ingenious many of them really are, but few give even the smallest promise of standing the rigid tests of practicability. Still the search for the substitute will go on. The failure of one inventor seems but to act as a spur to others in seeking the incalculably rich prize that surely would be bestowed on him who really provides for vehicles a wheel as buoyant as the present air-inflated type, but more enduring and economical. Nevertheless, an intimate study of all the devices thus far produced affords little on which to base the belief that the rubber tube filled with compressed air and its protecting casing will be deposed from the eminent place they occupy in the vehicle world.

DENTISTS CLAIM THAT THE LITTLE ROLLS OF COTTON dam are driving rubber dam out of the market. Just one d—— thing after another.

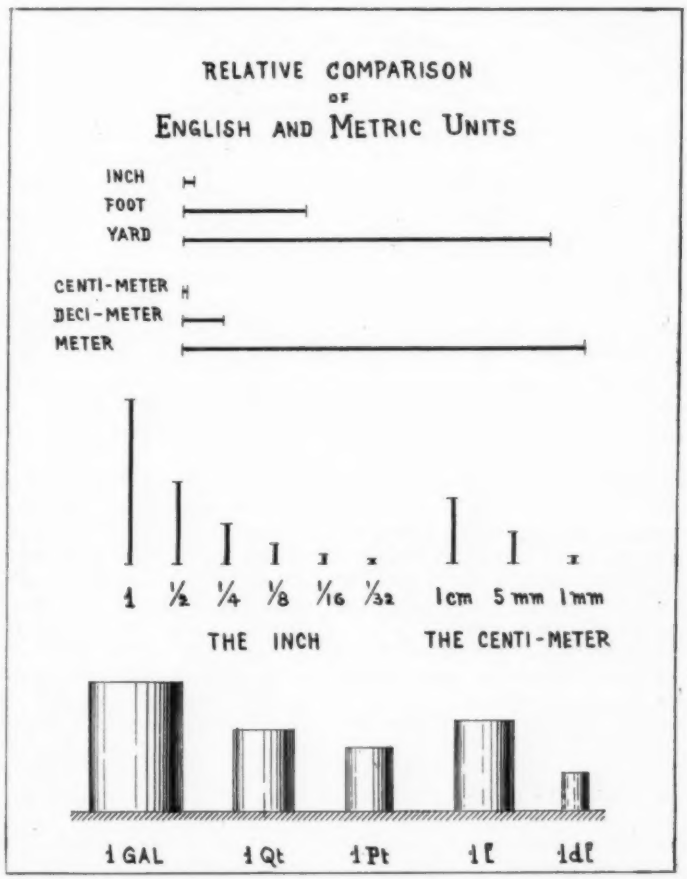
The Metric System Applied to the Rubber Industry.

By C. C. Stutz.[1]

AT THE PRESENT TIME a great deal is being written in the technical and industrial press of the country on the introduction of the metric system into the business affairs of the nation. Newspaper articles are also appearing on the subject, some laudatory of the system and some condemning it. It is being discussed from many angles. Both information and misinformation is quoted and enlarged upon.

This agitation in favor of the metric system has become of late more persistent. Investigation has shown that determined efforts are being made at Washington to induce Congress to pass laws for the "compulsory" use of the metric system of weights and measures. Members of both Houses of Congress have received a deluge of communications urging enactment of compulsory metric legislation and in the absence of opposition the opinion may be formed that such sentiment actually exists. Right here we must remember that the use of the metric system is legal in the United States, and has been so since 1866. Any one, therefore, is at liberty to use it. There is no objection to such voluntary use.

Should "compulsory" legislation be passed it would mean that after a period of say, two or three years, it would be obligatory under penalty to use only the metric system and to discard our present English system. Such a change may appear simple in the abstract, yet touching as it does the every-day affairs of everybody without exception, it contains large potentialities for mischief. For this reason it is wise to look into this problem by giving a brief outline of the metric system itself, and then taking up the conditions that such a change would create, first in a general way and second, how it would affect the rubber industry. After that, the advantages claimed for the metric system will be considered.



SOME RELATIVE COMPARISONS OF ENGLISH AND METRIC UNITS OF LENGTH AND VOLUME.

THE METRIC SYSTEM.

The metric system was, no doubt, at the time the eminent scholars conceived it, an earnest effort to create a scientific system of weights and measures. Unfortunately in those days industrial development was in its infancy and the men charged with the task having no practical considerations to guide them brought out a system based purely on scientific lines.

Since then conditions have changed. Industry has claimed an increasingly important position and has enlisted in its service an ever growing number of individuals. This multitude of artisans, in whose hands any system of measurements is but a tool like any other, has progressed or lagged behind according to the handiness and convenience of the system imposed upon it. To-day the great industrial nations are the United States and Great Britain, both of which have resisted the introduction of the metric system as an implement lacking the qualities so necessary for rapid development. This does not imply that the English system of measurements is perfect. Some of its units and sub-divisions have become obsolete by disuse. This is as it should be. It is a matter of evolution and growth stimulated by experience and changed conditions, and applies to most criticisms of this system.

The accompanying illustration shows some relative comparisons of English and metric units of length and volume. A study of Inch-Foot-Yard and Centimeter-Decimeter-Meter will show at once that the former three dimensions harmonize perfectly for practical use, while in the latter the unit sub-divisions of the meter represent too great a step from the meter itself. In the "inch" and "centimeter" the same defect is apparent to which is added the "indivisibility" of the centimeter as compared with the inch. To the mathematician this is a matter of indifference, but not so to the workman. Divide the inch into 1000th's and the millimeter into 100th's, as required in work of precision, and the metric unit is too small. There is no metric unit comparable with the "foot." This English dimension is used so universally that it would be a hardship to use the meter in its place. Similar observations hold good for measures of volume and weight.

Briefly stated the metric system is devoid of the English system's handiness and convenience; its units are either too large or too small for the every-day requirements of industry.

GENERAL RESULTS FOLLOWING ADOPTION OF METRIC SYSTEM.

Irrespective of the merits of the metric system, its compulsory adoption will in a general way affect the whole country.

[1] C. C. Stutz, a mechanical and electrical engineer with thirty-four years' professional experience, the greater part of which was devoted to development work here and abroad, was educated in Switzerland and brought up to the use of the metric system. On coming to the United States he became a naturalized citizen, familiarized himself with the English system of measurement and has used it alternately with the metric during periods aggregating from five to twelve years.

For instance:

(1) A long transition period will be required for changing from one system to the other. As matter of fact old units never disappear. Even in France after 83 years of compulsion the old units are still largely used in the textile industry. The same is true of many South American countries.

(2) A long transition period means the daily use of a dual system. Not only will familiarity with both systems be necessary but it must also be remembered what relation similar units in the two systems bear to each other. As for instance: 1 pound = 0.4536 kilogram and 1 kilogram = 2.2046 pounds.

(3) A great confusion between the two systems is bound to occur, because education is a slow process. This means of course errors, claims, expense and misunderstandings, if not worse.

(4) The discarding of all measuring tools and weighing appliances. This means not only the changing of habits for every individual, man or woman, but it also brings home to them the expense involved. The cost to the transportation companies, the industries and all merchants cannot be calculated.

(5) The recalculation and establishing of new prices for every commodity raised and manufactured to conform to the new standards of length, weight and volume.

(6) All standard goods called for in the new language will be expressed in odd dimensions, as a 7-inch channel will become a 177.8-millimeter channel. To avoid odd dimensions it can be made a 175-millimeter channel, using the multiple of 25 as is done abroad. The result will be the restandardizing of goods, a prospect almost hopeless, when the time and effort required to establish the present standards are considered.

(7) The cost involved in the change becomes appalling and the time required will cripple the industries for years, during which time they will be further handicapped by a flood of importations, thus playing into the hands of foreign competitors.

TABLE OF EQUIVALENTS.

English	to Metric.		Metric	to English.	
1 inch	= 25.4	millimeters	1 centimeter	= 0.3937	inch
1 square inch	= 6.4516	square centimeters	1 square centimeter	= .155	square inch
1 foot	= 304.8	millimeters	1 meter	= 3.2808	feet
1 yard	= 914.4	millimeters	1 meter	= 1.0936	yards
1 square yard	= .8361	square millimeter	1 square meter	= 1.196	square yards
1 gallon	= 3.7853	liters	1 liter	= .2642	gallon
1 quart	= .9463	liter	1 liter	= 1.0567	quarts
1 pound	= .4536	kilogram	1 kilogram	= 2.2046	pounds
1 long ton	= 1.016	metric tons	1 metric ton	= .9842	long ton
1 short ton	= .907	metric ton	1 metric ton	= 1.1023	short tons

1 pound per square inch = 0.07031 kilogram per square centimeter
1 kilogram per square centimeter = 14.2228 pounds per square inch

SPECIFIC RESULTS FOLLOWING ADOPTION OF METRIC SYSTEM.

The metric system in relation to the rubber industry will now be considered.

FACTORY EQUIPMENT: Factories for the production of rubber goods use a certain amount of standard equipment such as boilers, steam engines, electric generators and motors, pumps, hoists, valves, shafting, hangers, pulleys, pipes, screws, bolts, nuts, etc. Once the metric system is compulsory, replacements and additions are obtainable only in the new sizes. To fit these to the existing lay-out will be a task for any master mechanic, even should he be a metric enthusiast. Break-downs under such conditions will take on a more serious aspect.

Turning to the factory proper where rubber goods are made, a variety of machines, methods and processes are encountered which will all be affected. These are washers, dryers, mixers and grinders, masticators, cement churns, calenders, spreaders, presses and vulcanizers, tubing machines, etc. All this machinery will have to be made to the metric system; its sizes, capacities and output will carry metric designations, and the goods turned out will be called for in metric dimensions. New machines will be built to fit the new metric dimensions to which the goods may have been changed, but the older machines still hale and hearty may in some cases be obliged to work to reduced capacities, should it not be possible to enlarge them to increased metric dimensions. And should these dimensions be reduced from present ones the same observation fits the case. Only maximum output per machine spells economic production.

COMPOUNDS: While the machines themselves with their upkeep, repair and replacement present a problem, a more serious one is encountered in the question of rubber compounding. The ingredients are mixed according to weight. This means, to begin with, the changing of all scale-beams and runners or weights. The number of compounds used in the rubber industry is legion. Not only do different types of articles require different compounds, but the same article, an automobile tire for instance, is made from several compounds. A typical one follows:

AUTO TIRE TREAD—BLACK.

	Pounds.	Kilograms.
Fine Pará	45 =	20.412
Zinc oxide	25 =	11.34
Carbon black	10 =	4.536
Mineral rubber	6 =	2.7216
Aluminum flake	11 =	4.9896
Sulphur	3 =	1.3608
	100	

The equivalents in kilograms are given for all pound figures in the 100-pound batch. The size of batches varies from about 100 to 300 pounds, according to the capacity of the mixers.

The composition of a compound is the result of extended experience along the path of which many failures have made themselves felt. It is, therefore, not a matter to be trifled with. To translate the figures in use into metric values—and thousands will have to be so recalculated—means the use of decimal fractions of a kilogram. The fact that these are called "grams" does not alleviate the situation, for what superintendent would feel safe in giving his workmen such metric figures to work to? The smaller the batch the greater the danger of inaccuracy.

The trouble of course lies in the fact that the pound and the kilogram bear an unsatisfactory relation to each other. The Bureau of Standards gives this relation as:

1 pound = .4535924277 kilogram; the present writer has used:

1 pound = .4536 kilogram.

SPREADER GOODS: When fabric is to be covered or "spread" with rubber the calender man is instructed to spread a certain weight of rubber per yard of fabric, this depending on the width of the goods. For every pound per yard he will now spread 496 grams per meter of length, because:

1 pound = .4536 kilogram and 1 yard = 1.0936 meters, and 1.0936 x .4536 = .4960569 kilogram, or 496 grams.

VULCANIZING: The vulcanizing of rubber is done with steam at pressures varying from 40 to 75 pounds per square inch, and so the gages read. In the metric system the steam pressures are expressed in kilograms per square centimeter. Inasmuch as:

1 pound per square inch = 0.07031 = kilogram per square centimeter, equivalent readings on the gage now in use and the metric gage compare as follows:

Present (English) Gage. Pounds	Metric Gage. Kilograms
40	2.8124
45	3.1635
50	3.5155
55	3.8670
60	4.2186

As metric gages will be marked to even kilograms and probably to 10ths of kilograms, a latitude is left to the workman in guessing the pressure he has worked to heretofore.

When the metric gage reads kilograms:	The pressure in pounds per square inch would be:
3	42.6685
3.5	49.7799
4	54.8913
4.5	64.0027

Those familiar with vulcanizing will readily agree that absolutely no guessing is permissible in this operation. Therefore special gages would be required, which, while reading to metric figures, are calibrated to actual English pressures. Similar observations hold good for the testing departments and need not be enlarged upon. Of course a new set of gages, scales and measuring tools would have to be installed.

The superintendent will have his troubles in educating his men, but with patience it may be accomplished, provided he himself has first become proficient. His real difficulties will come when he has to use compound figures, such as pressures in kilograms per square centimeter; when fabric specifications are changed, giving new widths to be covered by rubber to the same thickness as on the English width fabrics, etc., etc.

CRUDE RUBBER: While the factory manager and the men in the shop are wrestling with their problems the purchasing agent in his office will be confronted with his own difficulties. Crude rubber is bought by the long ton, 2,240 pounds, and the prices are given in cents per pound. Supposing he needs 50 tons and the price is 47 cents: 1 long ton = 1.016 metric tons, therefore 50 tons = 50.8 metric tons, 1 kilogram = 2.2046 pounds and 2.2046 x 47 = $1.036 per kilogram.

The crude rubber importer, dealer and broker are equally affected; their contracts are changed to metric figures and so are prices, bills of lading, manifests and the whole system of bookkeeping.

COMPOUNDING MATERIALS: This holds good for all compounding ingredients, sundry supplies, solvents and oils. These are received in bulk, some in barrels, kegs and some in steel drums. And all these varied containers will be known according to metric figures, the goods themselves billed and paid for in like manner.

FABRICS: Supposing the purchasing agent in need of fabrics looks up quotations on carriage cloth, duck, sheetings, and tire fabrics. They will appear unfamiliar to him in their metric designations. The following calculations are made to show the work involved in changing these simple looking quotations from the English to their metric equivalents.

(A) Carriage cloth duck:

38-inch 2.00-yard enameling duck.....*yard* $0.46

This quotation interpreted into every-day language means that the cloth is 38 inches wide and that a piece 2 yards long weighs 1 pound, and the price per yard of length is 46 cents.

To convert this into metric figures:

38 inches = 38 × 25.4 = 964.2 millimeters.

To find the length of cloth weighing 1 kilogram:

1 kilogram = 2.2046 pounds and 2 yards of cloth weigh 1 pound,

then 2.2046 × 2 = 4.4092 yards in 1 kilogram.

Since 1 yard = 914.4 millimeters and 1 meter = 1.0936 yards,

4.4092 yards = 4.4092 × 914.4 = 4.032 meters = 4 meters 32 millimeters.

If one yard costs 46 cents, then

1 meter costs 1.0936 × 46 = 50.3 cents.

The quotation now will read:

964-millimeter, 4.032-meter enameling duck.*meter* $0.50.3

(B) Sheetings, 40-inch:

48 × 48, 2.35-yard.....*yard* $0.36

The quotation tells us that this fabric has 48 warp threads and 48 filler threads per inch. The fabric is 40 inches wide, a piece 2.35 yards long weighs 1 pound, and the price per yard of length is 36 cents.

To write this quotation in metric figures, centimeters will be used instead of inches, meters instead of yards and kilograms instead of pounds.

1 inch = 25.4 millimeters. (1 centimeter = 10 millimeters.)

40 inches = 40 × 25.4 = 1016 millimeters = 1 meter 16 millimeters.

To find the number of threads per centimeter:

25.4 : 10 as 48 : x, and x = 18.9 threads per centimeter.

To find the length of sheeting weighing 1 kilogram:

1 kilogram = 2.2046 pounds and 2.35 yards of sheeting weigh 1 pound,

then 2.2046 × 2.35 = 5.1807 yards in 1 kilogram.

Since 1 yard = 914.4 millimeters and 1 meter = 1.0936 yards,

5.1807 yards = 5.1807 × 914.4 = 4 meters 737 millimeters.

Therefore, a piece of sheeting 4 meters 737 centimeters long weighs 1 kilogram.

If 1 yard costs 36 cents, then:

1 meter cost = 1.0936 × 36 = 39.25 = 39¼ cents.

The quotation now will read:

Sheetings, 1 meter 16 millimeters:

18.9 × 18.9, 4 meters 737 millimeters.....*meter* $0.39¼

(C) Tire building fabrics:

17¼ ounce, Sakellarides, combed.....*pound* $2.90

This means that 1 square yard of this fabric weighs 17¼ ounces and that it is sold by the pound.

To convert this into metric figures:

1 square yard = 0.836 square meter and 1 square meter = 1.196 square yards.

1 pound = 16 ounces = 0.4536 kilogram or 453.6 grams, therefore 1 ounce = 28.35 grams.

17¼ ounces = 480 grams = weight of 1 square yard.

Therefore 1 square meter weighs:

1.196 × 489 = 584.84 grams, say 585 grams.

If 1 pound costs $2.90, then

1 kilogram costs = 2.90 × 2.2046 = $6.39⅕.

The quotation now reads:

Tire building fabrics:

585 grams, Sakellarides, combed.....*kilogram* $6.39

RECEIVING AND SHIPPING: As the railroads cannot afford to scrap their present freight car equipment to build new cars to even metric dimensions and capacities, and as the cars will have to be marked in that respect in metric figures, both the receiving and the shipping clerk will be confronted with strange figures. A standard railroad car 36 feet 6 inches long, capacity 40,000 pounds will be marked 11 meters 125 millimeters, capacity 18,144 kilograms. Where the freight classification list designates 18,000 pounds as the minimum load for this car, the figure will be 8,163 kilograms. Freight rates will be given per 100 kilograms.

ACCOUNTING AND STATISTICS. In all rubber factories a careful record is kept of the use of the various compounds and the goods made from them. Quotations, records, costs, bonuses, sliding scales, etc., being based on meter, kilogram and liter will all be affected and the accounting force as well as the statistical department will have to reckon with new conditions.

MANUFACTURED RUBBER GOODS.

Standardization is one of the mainstays of American industrial development. It makes possible mass production, cuts down costs and creates uniformity. To say that an article is standard implies desirability. To upset and throw down these standards is to use the axe on the roots of our industrial well-being. And this is precisely what the metric system would do.

In looking over the field of finished goods the list is so extensive that only a few can be mentioned here.

PNEUMATIC TIRES. Tire manufacture has been well standardized. To change to metric figures means not only obliterating present inch markings and the reengraving of molds to metric designations, but also the changing of over-all dimensions. A tire 104 by 914 millimeters would hardly be recognized as a 4½ by 36-inch. The making of new stock lists, price lists and labels follows as a consequence.

BELTING. Rubber belting is standardized as to width on the inch basis and made as to thickness from 2-ply up. The working load of a belt is a certain percentage of its breaking load in pounds per inch width. From this the engineer figures the belt width required for the horse power (English h.p. = 33,000 foot pounds per minute) needed at a given belt speed in feet per minute.

HOSE. Rubber hose is standardized as to its internal diameter in inches, listed per foot of length and rated to pressure in pounds per square inch. An example:

Pneumatic Tool Hose.	English.	Metric.
Internal diameter	½-inch	12.7-millimeters.

Working pressure (double fabric) 175 pounds per square inch, 12.304 kilograms per square centimeter.

List price	$0.47 per foot	$1.54 per meter

MATS, MATTING AND TILING. These are made to standard dimensions and priced per square foot or piece. Corrugated rubber matting, for instance, is carried in stock widths of 24, 30, 36 and 48 inches; the weights are as follows:

English. Weights per square yard.	
3/32-inch thick	5 pounds
⅛-inch thick	7 pounds
5/32-inch thick	10½ pounds

Metric. Weights per square meter.	
2.381 millimeters thick	2.712 kilograms
3.175 millimeters thick	3.975 kilograms
3.969 millimeters thick	5.696 kilograms

DRUGGISTS' SUNDRIES. The list of druggists' sundries and hospital supplies is a long one indeed and includes atomizer bulbs, camera bulbs, syringe bulbs, elastic bands, elastic cords, hard rubber combs, hard rubber funnels, medicine droppers, nipples, nipple shields, rattles, rubber thread, teething rings, tobacco pouches, syringes and water bottles.

Considering the last-named article, water bottles are standard 2 and 3-quart size.

2 quarts = 1.892 liters.
3 quarts = 2.838 liters.

To sell these articles by metric designations would be confusing to both the dealer and the customer. Therefore the retail trade would demand these goods in even figures. The nearest figures would be 1¾ and 2½ liters (7½ per cent small), or 2 and 3 liters (5.8 per cent large). It will be noticed that in the first case binary fractions are here applied to the decimal metric system, an anomaly to the metric faddist. Is it better to standardize the smaller or larger sizes, or should the dealer carry four sizes in stock where formerly he carried only two? In either case the habit of the buying public must be changed and as an additional burden the manufacturer will have to discard his molds and make new ones.

SPECIFICATIONS AND CATALOGS.—The requirements on some rubber goods are very exacting; as a case in point, the rubber insulation for electric wires. Specifications to cover them will have to be rewritten to metric figures and changed in many cases to avoid too extended metric decimal fractions which would not be practical to work to in the factory.

Goods must be advertised. This means new catalogs, after new standards have been settled on, and prices will have to be recalculated to suit them.

Goods must be properly boxed for shipment and attractive presentation to the trade. This means different size boxes to accommodate articles changed to rounded metric figures. This in turn requires new labels, change in billing, etc. Many goods are now packed and sold in dozens and gross. The metric law may compel us to sell them in 10's and 100's.

THE RUBBER INDUSTRY.

To gain a conception of what it would mean to change from a well grounded system of measurements to a system which has, aside from some theoretical considerations, little to recommend it, one must realize the extent of the industry which is asked to take this step. Crude rubber consumption may be taken as a fair indication of the importance of this industry.

	World Consumption. Tons.	United States and Canada. Tons.	United States and Canada. Per Cent.
1917	209,500	155,000	74
1918	210,000	187,000	89
1919	298,000	230,000	77

Furthermore, statistics show that the production of finished rubber goods in the United States was:

1914	$ 300,994,000
1919	1,200,000,000

Still another angle is obtained from the following:

VALUE OF UNITED STATES TIRE EXPORTS.

1913	$ 3,943,220
1914	3,505,267
1915	4,963,270
1916	17,936,227
1917	12,330,201
1918	13,977,671
1919	22,466,580

Viewed from the three angles given it is evident that the rubber industry of the United States is preeminent in the world to-day. These are facts, not fancies; definite statements, not generalizations. This industry is young, vigorous and full of promise for still greater achievements in the future. Shall it be hampered by throwing the "metric monkey wrench" into its machinery?

CLAIMS TO JUSTIFY DEMANDS FOR COMPULSORY USE OF METRIC SYSTEM.

Many claims are presented and urged for the compulsory use of this system. Some are so beside the facts that to consider them would be wasting space and time. The principal arguments are given and answered below.

SIMPLICITY CLAIMED FOR METRIC SYSTEM.—The claim is made that the metric system is very simple. Admitting its structural simplicity, it lacks those most important qualities of the English system, handiness and convenience, qualities which no academic perfection can replace.

This is conclusively shown by the fact that, although the metric system has been legal in the United States since 1866, little progress has been made toward its general use in the industries. Had it possessed the qualities mentioned it would have long ago crowded out the English system, which, imperfect as it is, has successfully held its own, and has enabled the United States to become a leader in industrial pursuits.

SUPPOSED NEED FOR WORLD TRADE.—The claim is made that this system is needed for world trade, that without it American markets cannot be extended to foreign countries.

In this connection the metric advocates have made much of the fact that when America first began the export of automobiles some cars were equipped with metric tires. Now all this has been changed. A prominent motor car company in a letter says: "Most South American countries take inch sizes with the exception of Chile," while another manufacturer says: "We furnish standard American tires on all our cars."

The American automobile industry standardized the tread of automobiles to 56 inches (4 feet 8 inches, practically railroad gage, which is 4 feet 8½ inches) against the wishes of users in the South, who, on the claim that southern roads were poor, asked for a 60-inch tread. In the Argentine the Americans came in competition with Italy which was furnishing any tread desired. In spite of this the Americans stuck to their standard and now Italy has fallen into line. The standard automobile tread the world over is 56 inches = 1 meter 422 millimeters.

CLAIMED WON THE WAR FOR ALLIES.—The claim is made that the Allies won the war on account of their standardizing to the metric system. All that need be said is that if the metric system has won the war for France, then the metric system has also lost the war for Germany.

SUPPOSED UNIVERSAL DEMAND.—The claim is made that between 90 and 99 per cent of the people of the United States want the metric system, therefore its use should be made compulsory.

In refutation of this assertion only a few facts need be recorded here, such as the following. In January, 1920, the Pittsburgh Chamber of Commerce, Robert Garland, chairman, representing a district which, according to statistics, produced in 1918 manufactured articles to the value of $2,305,000,000, passed resolutions condemning legislation in favor of the metric system.

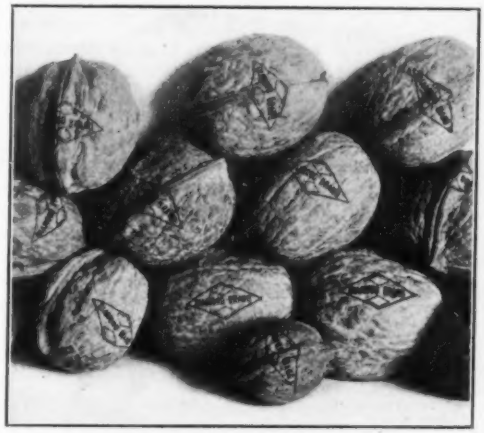
At a meeting held in Chicago, March 16, 1920, the American Railway Engineering Association in convention assembled, passed resolutions against the adoption of this system. Other associations, at various dates and places, did the same.

CONCLUSION.

The space allotted is exhausted and yet the writer has touched only the high spots and these in only a fragmentary way. A great deal more could be said and from many other angles. It is obvious that the writer does not favor the use of this system being made compulsory. If it possesses the advantages claimed for it by its advocates it will prove them, its use being permitted by law. If it cannot win on its own merits by voluntary adoption under the protection of this law, it is not entitled to win under a law of force.

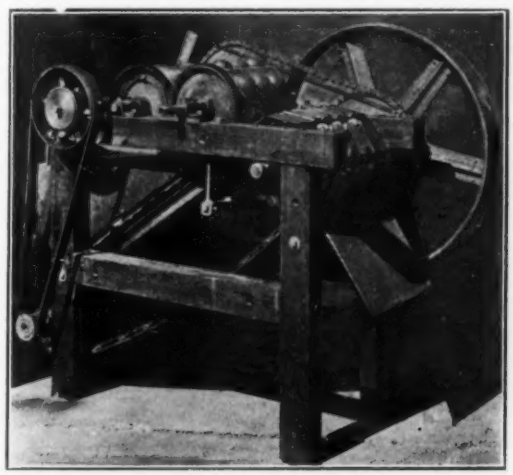
RUBBER BALLS BRAND WALNUTS.

STILL another instance of the infinite variety of uses to which rubber can be put is afforded by a newly-invented machine which is being tried by the California Walnut Growers' Association, and which is the device of Ansel L. Wysong of Los Angeles. It was selected from among thousands of other contrivances submitted by contestants for the $10,000 prize offered by the Association, which markets nearly fifty million pounds of walnuts annually and which last year did a business of over $14,000,000.



WALNUTS BRANDED BY MEANS OF RUBBER BALLS.

The essential feature of the machine is a steel cylinder in the surface of which is engraved a series of intaglio branding dies. This cylinder rotates in a bath of quick-drying ink and is engaged with a second cylinder of the same size which carries firmly, in pockets in its surface, soft rubber balls. These balls are so placed that each comes into direct pressure contact with its corresponding engraving on the steel cylinder, receives the impression of the trademark, and transfers it to the shell of the walnut after a further quarter-revolution. An ingenious hopper-conveyor arrangement insures the positive engagement of each walnut with the printing balls, which, being soft and resilient, impress the brand into the tiny cracks and over the sharpest ridges of the shells. Water is run through the steel cylinder to prevent the overheating of the rubber balls through friction.



WALNUT BRANDING MACHINE.

Besides being used for walnuts, it is likely that the machine may be licensed for branding oranges, lemons and other fruit.

Rubber Creations for Moving Pictures.

THAT several hundred moving picture companies with large plants and millions invested should use much rubber of the every-day sort is axiomatic. But that the cinema industry should demand an absolutely new line of products comes as a surprise. Yet such is the case, and so great has the demand become that a rubber factory has been built which specializes in this novel line.

HUGE RUBBER SHARKS AND SEA MONSTERS.

When a breathless audience sees a deep-sea diver kill a hungry shark they do not guess that the fish was created in a rubber factory. The shark is actually an air-inflated affair, built of rubber stretched over a light metal frame, with a double underside, suitably painted, having a hinged jaw, and operated by wires a few feet under the water.

When an enormous octopus encloses a man in his terrible tentacles to carry him to certain death, the creature, like the shark, is also made of sheet rubber. From the shore a man with a compressor pumps air through hundreds of feet of rubber hose, inflating the octopus and insuring the slow-encircling movement of the tentacles. Ample sunlight, remarkably clear water, a rocky coast and a deep-sea camera are the other essentials.

Whales and antediluvian monsters are also built up over light frames, the calendered stock being compounded for the dry heat cure. Seams are doubly reinforced and stays are put in wherever there is any likelihood of extra strain. Only a low air pressure is practicable in the larger creations as the air force is so great that a very little extra pressure will burst the huge air bag.

RUBBER SWORDFISH FOR COMEDY WORK.

A world-famous comedian ordered a big swordfish, with its serrated snout set upright instead of sidewise. This was accomplished. Soon the comedian was being pursued through a water-filled tank by the rubber fish, receiving vicious thrusts from its

CAPTIVE SURF-SWIMMING SHARK.

sword. Of the same type of creation are the big surf fishes, every fish when inflated being capable of carrying three mermen or mermaids.

RUBBER SPEARS, BATTLE AXES AND BLUDGEONS.

A great battle scene in the Middle Ages required a big supply of war material. The battle axes were made with light sheet metal centers, rubber-covered and with deep rubber edges. The maces for breaking armor had rubber-covered cork ball tops, rubber spikes being vulcanized to the balls. The realistic swords were rubber, painted steel color. The daggers were thin metal blades with two-inch soft rubber points.

DRIVING AN ARGUMENT HOME.

For an ancient Mexican scene the Aztec Army was armed with huge clubs, each club head representing a skull or dried head of an enemy. This was done in rubber, the sketches for the molds being supplied by research artists in a famous studio. The same sort of creation, although pneumatic, is used in the huge hammers which "drive an argument home."

The spear heads are a line of manufacture in a class by themselves. They are made of a fairly high grade compound that is dense enough to appear rigid and yet as soft as velvet to the touch. They are cured in two-part molds with an iron socket, into which the spear shaft is set. If the spears are likely to see much service the iron is first cleansed from all trace of grease and dipped in copper solution. When the cure is effected the sulphur in the rubber unites chemically with the copper and the rubber is stuck so tightly that it cannot be loosened except by cutting with a cold chisel.

Halberd heads are cut out of sheet stock, following a paste board pattern, and cured between metal plates in a steam press. The cutting edge and the points are skived down after curing and the whole given a final coat of steel colored paint to more closely simulate metal.

RUBBER AND A BURSTING BOILER.

A very exciting scene is provided when movie villains tie their victim to an upright steam boiler, then rouse the furnace to its utmost fury, and leave the poor fellow to be blown to atoms. But it only seems to happen. The boiler is of rubber, its rivets tiny rubber half-balls cemented to its side; the steam gage is an exaggerated air gage and before the boiler explodes a straw dummy has been substituted for the writhing victim. The effect is heightened by the air pressure gradually distending the boiler

sides until the rivets begin to fall off. A blinding cloud of steam, released from a pipe nearby at the critical moment, gives the final touch of realism.

A movie director who had much trouble in getting real bovines to yield milk when, where, and in any quantity wanted, commissioned the company to produce for a wooden cow he was having built a huge udder of rubber. The result was the most docile bossy imaginable, which broke all records as a milker.

Another order was for an air-cushioned bag into which a man could be fastened and then thrown off the roof of a sky-scraper to bounce about in the street below. Up to date this order had not been filled.

A harrow turned upside down is a murderous looking affair, especially when an I. W. W. hurls an honest farmer upon it. With teeth of rubber, however, one falls very comfortably and the movie rubber factory makes such teeth.

Every fresh demand for bird, beast, reptile or appliance entails special problems and often original tools and appliances. A considerable degree of general knowledge and engineering skill are required, but above all adaptability and inventive faculty are prime requisites. For example, in building a huge rubber shark weight distribution must be studied so that the completed creature will float, not only right side up but on an even keel. There is also the difficulty of holding air in the hollow carcass once it is submerged, as a very slight extra pressure will force the air out and bring about a collapse.

Take it all in all, the business, although fascinating and specialized in the highest degree, is not one that every one could engage in successfully. It is, however, another triumph for rubber and has made many hazardous and impossible scenes safe and successful.

A SCREEN STAR DRESSED IN RUBBER.

NEW EFFECT IN RUBBERIZED RAIMENT.

A novelty in dress, of interest, is a black cambric, glossy, rubberized cloth, garment in which Miss Bebe Daniels, Famous Players-Lasky motion picture star, recently appeared. The gown is modishly designed and it made a particular hit in the studio, where it photographed with even more luster than satin. The material, which has already been tried to some extent on women's hats, is much thinner, lighter, and more pliant than the finest qualities of painted fabrics, or enamelled cloth, and, as might be inferred, it is impermeable to moisture.

FIRST FEDERAL FOREIGN BANKING ASSOCIATION.

In passing the Edge Bill, Congress has provided machinery, in the form of international banks under Federal charter and under the direct supervision of the Federal Reserve Board, for the financing of this country's export trade. The great depreciation of European currencies in international exchange has erected a barrier against the export trade of the United States. Manufacturers who have built up substantial markets for their products, particularly in Europe, through years of effort, are finding it increasingly more difficult to continue the sale of their goods. European purchasers of our products are unwilling to settle at existing rates of exchange, but in many cases are willing to continue to do business on the basis of credit in the belief that as the work of rehabilitation progresses production will increase, and that within a reasonable time exchange will show a favorable improvement.

Up to the present time, however, the American manufacturer has had no banking facilities enabling him to meet this situation, or permitting him to compete in foreign markets on a credit basis.

The Edge Bill is so drawn as to permit the association of banks and manufacturers in the organization of foreign banking corporations, and in the organization of the First Federal Foreign Banking Association this plan has been followed.

A group of banks selected in New York, Boston, Philadelphia, Buffalo, Bridgeport, Worcester and Springfield, Massachusetts, have underwritten the capital stock for the benefit of manufacturers, in their localities, who are interested in foreign trade. The stockholders of the new bank will, therefore, be manufacturers and banks. The manufacturers, in contributing their business to the bank, will share in the profits of such business. The banks will act as the distributing centers for acceptances, guaranteed paper and other obligations issued by the bank. The new bank, therefore, has the features of a mutual company through which the manufacturers who are stockholders will obtain capital, for financing their foreign business, from the investors of the country, and in furnishing business to the bank will participate in the profits of it. A line of discount on foreign paper bearing some proportion to the capital invested will be granted to manufacturers who are stockholders. In effect, therefore, the proposed plan of organization contemplates that manufacturers interested in foreign trade shall, through their stock ownership, provide a margin in the shape of capital which will furnish an additional security for the obligations to be issued to the public.

The initial capital of the bank will be $2,100,000, evidenced by 20,000 shares of a par value of $100 per share, and 1,000 founders' or managers' participation shares of the same par value. These latter shares are to be entitled to receive 15 per cent of the net earnings, and can be held only by the founders, directors and officers of the company. The purpose of these shares is to enable the organization to secure men of exceptional talent and experience for the work of managing this enterprise, and to obtain the close cooperation of important agencies abroad. The stock of the First Federal Foreign Banking Association, including the founders' or managers' shares, has all been underwritten at $105.

SHIP BY TRUCK—GOOD ROADS WEEK.

National Ship by Truck-Good Roads Week, to be observed May 17 to 22, inclusive, is being planned throughout the country. Tentative plans include motor truck tours covering virtually every section of the country, giving practical demonstrations of the utility of truck transportation and preaching the doctrine of better highways.

Other plans include essays by school children, sermons and the distribution of literature, all designed to arouse interest in a national program of highway construction along lines already advocated by such organizations as the American Automobile Chamber of Commerce, the National Grange, the United States Chamber of Commerce, the National Automobile Chamber of Commerce, the National Association of Motor Truck Sales Managers, and the Ship by Truck Bureau.

Public officials everywhere heartily approve the general idea involved in ship by truck week.

Stabilizing Southwest Cotton Industry.

COTTON-GROWING is assuming such large proportions in the Southwest, and so many are the problems to be solved in connection with the expanding industry, that leading growers and dealers in this essential commodity of automobile tire manufacture have formed the Pacific Cotton Exchange in Los Angeles, California, which will also make the latter city the chief distributing point for the product of the plantations of California and Arizona. The establishment of the exchange is expected to give the raising of Pima or long-staple cotton a great impetus in the states named, and incidentally yield considerable service to the rapidly growing rubber industry in southern California, which was beginning to feel keenly the need of such a "balance wheel" for the new cotton trade.

One of the chief objects of the exchange, as set forth by its president, Thomas W. McDevitt, to a representative of THE INDIA RUBBER WORLD, is to stabilize prices. There is no "future" market for long Pima, as production and grades have been uncertain, and standards of quality must be established, as well as fair prices be insured to producer and consumer. Owing to the great demand that has sprung up, and as large sums will be loaned to handle and market the cotton, the new exchange also purposes seeking state legislation to safeguard the large amounts that will be advanced to aid the industry. As cotton is a cash crop, definite rules must be set up for making loans on commercial paper, warehouse receipts and bills of lading, as well as for insuring against losses of various kinds. Means will also be devised for protecting crops against insect ravages.

THOMAS W. MCDEVITT.

The new exchange has temporary quarters in the I. W. Hellman Building, and its sessions start at 6 a. m. daily to conform to the hour of opening of the New York Cotton Exchange —9 a. m. Eastern time. The other officers chosen, besides Mr. McDevitt, are: M. P. Scott of McFadden Bros., vice-president; K. M. Turner, treasurer; C. H. Hartke, attorney; Board of Directors, Messrs. McDevitt, Scott, Turner, Hartke, and E. M. Fowler of the E. M. Fowler Co.

Mr. McDevitt says that in California and Arizona, 200,000 acres are now producing cotton. They should yield 100,000 bales or, at an average of 500 pounds to the bale, a total of 50,000,000 pounds this year. The Goodyear, Fisk, Firestone, and other tire concerns, which are financing many growers, as well as raising a great amount of cotton themselves, guarantee a price of 60 cents a pound with growers' option on the market beyond that price within a year. At this price the total value of the southwest cotton yield this year will be at least $30,000,000, not counting the seed, which will be worth about $5,000,000 more.

The average cost of putting the cotton in bales is 22 cents a pound and some has been sold recently at $1.24. In 1916 when the Goodyear Tire & Rubber Co. took over 7,000 acres for planting in the Salt River Valley, Arizona, at the instance of Mr. McDevitt, cotton was selling at 52 cents a pound. He ventured the prophecy that in three years it would sell for 75 cents and that the total southwest cotton area would reach 175,000 acres. Both figures have been far eclipsed. The value of Arizona cotton in 1914 was $2,000,000; in 1919 it reached $45,000,000. At the present rate of growth it is expected to total $100,000,000 in 1922.

Land values have shared in the southwest cotton boom, too. Choice acreage that could be had three years ago for $125 now brings $500, and land renting for $10 an acre in 1916 easily rents for $60. This soil is irrigated with water from the Colorado River, which has in a large measure come to be in the Southwest what the Nile is in Egypt, where land sells from $600 to $800 and yet yields a large return on the investment. Plans are now being considered for a wide extension of the fertile area through desert irrigation by means of new canals in California and Arizona from the Colorado river.

The president of the new exchange is very optimistic, not only about cotton-growing, but also about the rubber industry in the Southwest. He says that cotton raised there can meet plantation rubber in Los Angeles and, after being fabricated into tires, can be taken through the Panama Canal to New York and there compete with any similar products of Akron. All of this he promises in the very near future.

TO ORGANIZE INTERNATIONAL CHAMBER OF COMMERCE.

The new International Chamber of Commerce, projected at the International Trade Conference at Atlantic City, New Jersey, last October, will be formally organized at Paris during the week of June 21, 1920. Invitations have been sent out by the American group of the International Organization Committee to business and industrial associations, asking them to name delegates to participate in the organization meeting. About 100 American delegates are expected to attend.

The International Organization Committee is to meet at Paris in advance of the general organization meeting to prepare and report a plan of permanent organization.

In view of the disturbed conditions in international trade brought about by the exchange situation, this meeting is expected to assume additional importance. The vital question of international credit, as well as shipping, tariff regulations, unfair competition in international trade, and other problems of equal moment affecting stability in international trade and production in all the principal countries in the world, will be discussed.

The International Chamber succeeds the old International Congress of Chambers of Commerce, which ceased to function with the outbreak of the World War in 1914.

Membership is to consist of chambers of commerce, commercial organizations, banking and similar associations, firms, corporations and individuals, holding associate but not voting membership. Meetings of the membership will be held every two years, and a system of referenda will be inaugurated during the interval between the bi-annual meetings.

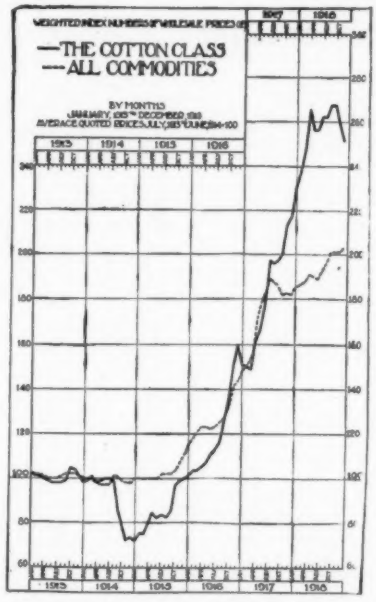
At the first meeting in June only the five countries participating in the International Trade Conference—the United States, Belgium, Great Britain, France and Italy—will be represented. Later, business organizations in the other principal countries of the world will be taken into membership.

Prices of Cotton and Cotton Products.[1]

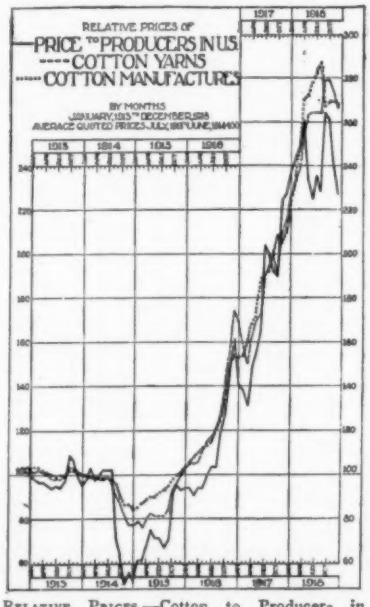
WAR INDUSTRIES BOARD.—Bulletin No. 23 dealing with the prices of cotton and cotton goods, is one of 50 inquiries into wartime prices in different industries. The aim of these studies is to make the price quotations, gathered by various government agencies, available to men interested in problems of business readjustment and also to provide a permanent record of the great revolution in prices during the six years ending in 1918.

To throw as much light as possible upon the course of price fluctuations, this bulletin begins with a brief account of conditions prevailing in the cotton industry. Data regarding production, imports, exports, stocks, government purchases, and government control are woven into the account, and the factors that exercised special influence upon markets are emphasized.

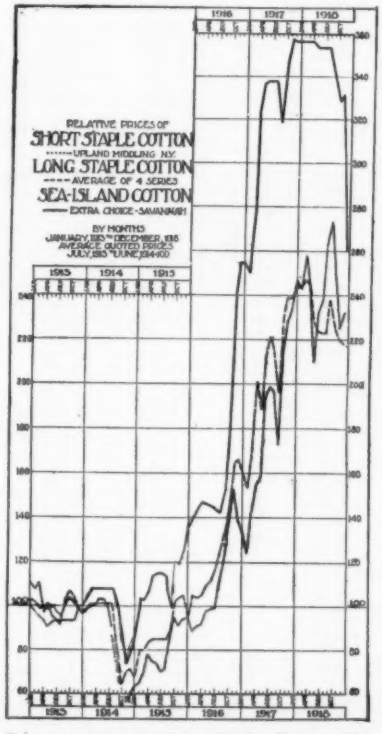
The price charts scattered through the bulletin are drawn on a uniform scale. Since the inquiry centers in the effect of the war, the charts are made to show the movement of prices away from the prewar level. This effect is produced by considering the average of the actual prices during the 12 months preceding the outbreak of war (July 1, 1913, to June 30, 1914) as equal to 100 and reducing the actual prices for each month from January, 1913, to December, 1918, to the form of relative prices with the prewar average as base. For example, if the selling price of a commodity averaged $2 a pound in the 12 months before the war, and if it fell to $1.80 in October, 1914, the relative price in that month would be 90; if the price rose to $4.60 in July, 1918, the relative price would be 230. On this plan, the price charts are comparable one with another.



WEIGHTED INDEX NUMBERS OF WHOLESALE PRICES.—Cotton Class and "All Commodities."—By months, January, 1913, to December, 1918. (Average quoted prices, July, 1913, to June, 1914=100.)

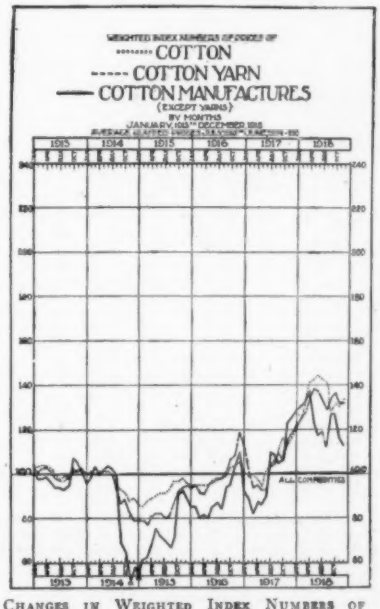


RELATIVE PRICES.—Cotton to Producers in United States, and Weighted Index Numbers of prices of Cotton Yarns and Cotton Manufactures.—By months, January, 1913, to December, 1918. (Average quoted prices, July, 1913, to June, 1914 = 100.)



RELATIVE PRICES.—Short Staple Cotton, Upland Middling, New York; Long Staple Cotton, average of four series; and Sea Island Cotton, Extra choice Savannah. By months, January, 1913, to December, 1918. (Average quoted prices, July, 1913, to June, 1914=100.)

An enumeration of the successive steps in making these index numbers will show their meaning. First, for every commodity included in the computation there was made an estimate of the quantity produced in the United States in 1917 plus the quantity imported. Second, the price of the commodity in each month in the six-year period covered was multiplied by the "weight." Third, the products of the different commodity prices times their weights



CHANGES IN WEIGHTED INDEX NUMBERS OF PRICES.—Cotton, Cotton Yarns and Cotton Manufactures compared with Index Number of "All Commodities."

[1]Abstracted from War Industries Board Bulletin No. 23, "Prices of Cotton and Cotton Products," by James Harvey Rogers, assisted by Grace M. Fairchild and Florence Dickinson.

WHOLESALE PRICES OF COTTON AND COTTON PRODUCTS, BY MONTHS AND YEARS, 1913-1918, INCLUSIVE.

	Cotton.											
				Price Differences On and Off Middling. Short Staple.		Long Staple.						
	Upland Middling.	Upland Middling.	Upland Middling.	Good Middling.a	Low Middling.b	Strict Middling, 1⅛ Inches.	Strict Middling, 1¼ Inches.	Strict Middling, 1⅜ Inches.	Strict Middling, 1⅝ Inches.	Sea-Island, Extra Choice.	Egyptian, Sakellarides, Medium.g	Average Price to Producers.
Market	Liverpool.	New York.	New Orleans.	New York.c	New York.c	New Bedford.	New Bedford.	New Bedford.	New Bedford.	Savannah, Ga.	Landed U. S.	U. S.
Unit	Pence. Pound.	Pound.	Pound.	Pound.	Pound.	Pound.	Pound.	Pound.	Pound.	Pound.	Pound.	Pound.
Base price	7.2300	$0.1312	$0.1306	$0.0057	$0.0107	$0.1611	$0.1728	$0.1864	$0.2112	$0.2642	$0.2288	$0.1218
1913—Year	6.9000	.1279	.1270	.0048	.0085	.1590	.1739	.1873	.2054	.2023	.2306	h.1202
January	6.8800	.1306	.1256	.0046	.0080	.1600	.1800	.1975	.2100	.2260	.2300	.1220
February	6.8400	.1280	.1247	.0046	.0080	.1575	.1775	.1950	.2100	.2200	.2300	.1190
March	6.8400	.1259	.1246	.0046	.0080	.1583	.1763	.1858	.1963	.2250	.2300	.1180
April	6.8500	.1229	.1246	.0046	.0080	.1600	.1775	.1875	.1925	.1988	.2300	.1180
May	6.7000	.1200	.1231	.0046	.0080	.1550	.1738	.1875	.1975	.2070	.2300	.1160
June	6.7300	.1219	.1248	.0046	.0080	.1650	.1750	.1875	.1975	.1950	.2300	.1150
July	6.6600	.1235	.1242	.0046	.0080	.1500	.1675	.1875	.2000	.1900	.2233	.1160
August	6.5400	.1211	.1202	.0046	.0080	i.1500	i.1660	i.1875	i.1990	.1900	.2233	.1150
September	7.5500	.1346	.1311	.0046	.0080	i.1690	i.1750	i.1875	i.2150	.1900	.2233	.1180
October	7.6800	.1400	.1372	.0046	.0080	.1675	.1788	.1925	i.2200	.1900	.2284	.1330
November	7.4500	.1368	.1336	.0054	.0098	.1635	.1740	.1860	i.2175	.1900	.2474	.1300
December	7.1400	.1300	.1297	.0065	.0125	.1592	.1700	.1825	i.2100	.2050	.2423	.1220
1914—Year	6.4400	.1121	.1119	.0054	.0125	.1416	.1574	.1738	.1929	.2018	.2190	h.1059
January	7.0800	.1270	.1296	.0065	.0125	.1596	.1700	.1825	i.2075	.2040	.2283	.1170
February	7.0500	.1280	.1291	.0065	.0125	.1588	.1700	.1875	i.2090	.2150	.2243	.1190
March	7.0700	.1326	.1295	.0065	.0125	.1600	.1725	.1875	i.2130	.2200	.2207	.1260
April	7.3200	.1318	.1314	.0065	.0125	.1625	.1763	.1875	i.2125	.2200	.2206	.1190
May	7.4600	.1345	.1335	.0065	.0125	.1625	.1763	.1875	i.2155	.2200	.2270	.1220
June	7.7200	.1346	.1378	.0065	.0125	.1625	.1772	.1875	i.2160	.2200	.2308	.1240
July	7.3800	.1313	.1331	.0065	.0125	.1625	.1775	.1875	i.2130	.2200	.2345	.1240
August	6.3000	.1200	d.1200	.0065	.0125	.1625	.1775	.1875	i.2020	.2200	.2595	.1240
September	5.9100	e.0838	.0838	.0037	.0125	i.1200	i.1375	i.1600	i.1650	.2025	.2050	.0870
October	5.1300	e.0692	.0692	.0028	.0125	.0713	i.1130	.1450	i.1520	.1720	.1802	.0780
November	4.5600	.0763	.0742	.0028	.0125	.0992	.1200	.1408	.1550	.1500	.2010	.0630
December	4.4500	.0759	.0721	.0040	.0125	.1000	.1200	.1450	.1550	.1650	.1960	.0680
1915—Year	5.8600	.1015	.0962	f.0051	f.0097	.1324	.1497	.1752	.1891	.2260	.2043	h.0888
January	4.9300	.0828	.0783	.0052	.0090	.1075	.1305	.1528	.1670	.1763	.1637	.0660
February	5.0500	.0854	.0804	.0053	.0090	.1125	.1400	.1613	.1750	.2119	.1700	.0740
March	5.2000	.0899	.0836	.0055	.0099	.1138	.1392	.1610	.1750	.2100	.1820	.0740
April	5.7200	.1029	.0947	.0054	.0100	.1256	.1388	.1625	i.1900	.2165	i.1875	.0810
May	5.3300	.0984	.0906	.0053	.0100	.1275	.1425	.1700	i.1860	.2338	.2031	.0910
June	5.2800	.0967	.0911	.0052	.0098	.1275	.1425	.1700	i.1850	.2350	.2023	.0860
July	5.1800	.0920	.0869	.0052	.0097	.1275	.1425	.1700	i.1810	.2350	.2070	.0860
August	5.4000	.0938	.0895	.0048	.0096	i.1275	i.1435	i.1725	i.1810	.2338	.2050	.0810
September	6.2500	.1098	.1053	.0045	.0098	.1292	.1500	.1742	i.1970	.2013	.2200	.0850
October	7.2100	.1250	.1203	.0048	.0099	.1617	.1775	.2000	i.2130	.2445	.2412	.1120
November	7.0500	.1189	.1155	.0050	.0099	.1631	.1758	.2038	i.2075	.2450	.2299	.1160
December	7.6300	.1236	.1185	.0051	.0093	.1663	.1775	.2050	i.2120	.2565	.2401	.1130
1916—Year	9.0000	.1447	.1412	.0042	.0072	.1919	.2121	.2427	.2563	.3383	.3181	h.1350
January	8.1800	.1240	.1205	.0048	.0083	.1668	.1775	.2050	i.2140	.2800	.2875	.1140
February	7.8500	.1174	.1142	.0048	.0078	.1663	.1775	.2050	i.2090	.2875	.2857	.1150
March	7.8100	.1194	.1177	.0048	.0076	.1625	.1775	.2050	i.2110	.2970	.3110	.1110
April	7.7600	.1206	.1188	.0047	.0076	.1638	.1775	.2110	i.2120	.3000	.3018	.1150
May	8.4200	.1291	.1257	.0048	.0076	.1690	.1866	.2150	i.2250	.2975	.2648	.1150
June	8.3200	.1294	.1280	.0046	.0070	.1750	.1922	.2200	i.2255	.2970	.2772	.1220
July	8.0400	.1304	.1303	.0045	.0066	.1825	i.1952	.2350	i.2350	.2938	.2722	.1250
August	8.8500	.1454	.1417	.0039	.0066	i.1900	i.2142	i.2500	i.2550	.2900	.2772	.1260
September	9.5600	.1584	.1532	.0032	.0068	.1975	.2333	.2625	i.2770	.3095	.2972	.1460
October	10.4300	.1812	.1723	.0032	.0070	.2195	.2520	.2805	i.3250	.3844	.3372	.1550
November	11.9900	.2006	.1960	.0034	.0066	.2569	.2858	.3081	i.3600	.4844	i.4300	.1800
December	10.9600	.1824	.1757	.0034	.0066	.2594	.2908	.3213	i.3270	.5205	.4754	.1960
1917—Year	16.4500	.2350	.2264	.0040	.0067	.3121	.3566	.3841	.4113	.6527	.5806	h.2147
January	10.9600	.1763	.1735	.0037	.0066	.2494	.2738	.3175	i.3200	.5200	.5300	.1710
February	10.9500	.1631	.1708	.0037	.0066	.2413	i.2630	.3025	i.3100	.5100	i.5375	.1680
March	12.2800	.1859	.1764	.0038	.0063	.2613	i.2960	.3125	i.3500	.5570	i.5450	.1590
April	12.7100	.2033	.1950	.0038	.0062	.2833	i.3290	.3470	i.3800	.6625	i.5550	.1800
May	13.2900	.2076	.1995	.0039	.0062	.2906	i.3350	.3600	.3850	.6875	i.5650	.1890
June	17.6000	.2545	.2421	.0039	.0062	.3125	.4100	.3900	.3850	.6900	i.5750	.2020
July	19.0800	.2612	.2525	.0039	.0062	.3250	i.4250	.4130	i.4200	.6900	i.5850	.2470
August	19.2900	.2586	.2513	.0038	.0065	.3250	.3750	.4188	.4500	.6900	i.5950	.2430
September	17.7100	.2271	.2160	.0038	.0065	.2925	i.3250	.3833	i.4700	.6513	i.6050	.2340
October	19.9700	.2813	.2659	.0041	.0069	.3495	.4150	.4275	.4925	.6975	i.6150	.2330
November	21.8800	.2991	.2804	.0046	.0078	.3844	.4163	.4463	.4863	.7320	i.6250	.2730
December	22.2800	.3060	.2894	.0050	.0089	.3888	.4163	.4431	.4875	.7300	i.6350	.2770
1918—Year	22.7300	.3178	.3113	.0091	.0244	.3886	.4061	.4227	.4533	.7077	.6416	h.2948
January	23.1900	.3236	.3105	.0053	.0096	.4044	.4250	.4450	.4900	.7300	i.6350	.2890
February	23.2100	.3185	.3097	.0058	.0102	.4067	.4275	.4467	.4858	.7300	i.6350	.2970
March	23.9600	.3386	.3291	.0065	.0124	.4125	.4350	.4500	.4825	.7300	i.6350	.3020
April	22.9800	.3172	.3260	.0077	.0148	.4106	.4283	.4463	.4775	.7281	i.6350	.3180
May	21.3900	.2749	.2894	.0106	.0193	.3933	.4000	.4067	.4533	.7225	i.6350	.2850
June	21.9700	.3039	.3066	.0133	.0265	.3738	.3940	.4100	.4450	.7225	i.6350	.2740
July	21.6600	.3123	.2945	.0133	.0324	.3750	.3917	.4075	.4350	.7225	i.6350	.2860
August	23.1100	.3446	.3038	.0109	.0329	.3794	.3900	.4088	.4175	.7225	i.6350	.2780
September	24.5800	.3578	.3578	.0095	.0324	.3867	.4267	.4392	.4581	.6988	i.6400	.3220
October	23.7000	.3249	.3150	.0083	.0316	.3850	.3875	.4119	.4288	.6700	i.6500	.3180
November	21.5400	.2953	.3007	.0086	.0323	.3700	.3838	.4013	.4275	.6750	i.6600	.2930
December	21.1800	.3042	.2958	.0085	.0317	.3650	.3853	.4000	.4288	.5313	.6700	.2760

a On middling. b Off middling. c New York to March, 1915. Average of 11 markets designated by Department of Agriculture, March, 1915, to December, 1918, inclusive. d New York price. e New Orleans price. f Government action taken on December 24, 1914, altered somewhat the standards of grading, but contracts made on the old basis were permissible to February 17, 1915. This probably explains many abrupt changes in prices. g Beginning September, 1917, market, f. o. b. Alexandria, Egypt. h Not weighted according to quantities marketed each month. i Interpolated.

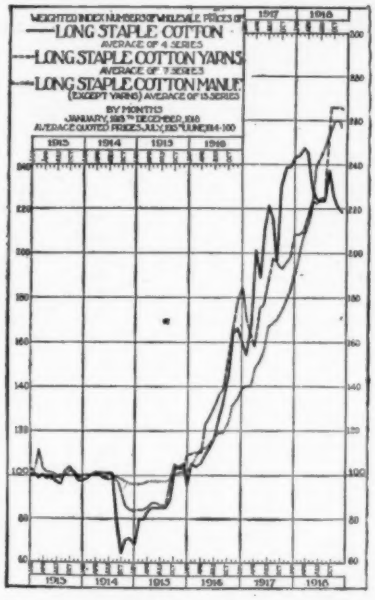
were added up separately for each month. Finally, the monthly aggregates were turned into relatives on the prewar base; that is, the average aggregates of July, 1913, to June, 1914, were made equal to 100, and all the monthly aggregates were made over on that scale.

It is evident that the index numbers made on this plan for an industry are strictly comparable to the relative prices for particular commodities shown in the charts. By the use of these indexes a clear idea can be obtained of average price fluctuations in a given branch of business, and fluctuations in one industry can be compared with those in others.

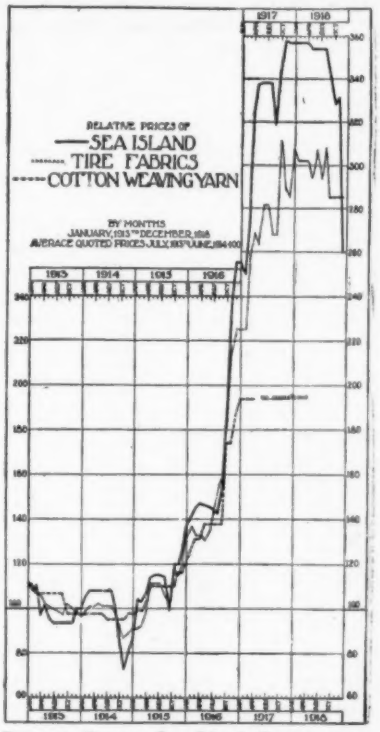
DETAILED STUDY OF PRICE MOVEMENTS.

In any study covering a period of rapidly changing price levels, the significance of price movements of individual commodities or classes of commodities is fully brought out neither by absolute increases nor by increases relative to prices prevailing in some representative year chosen as a base. In fact, both of these methods are inadequate for depicting commodity price movements, unless some direct comparison can be made at all times with the movement of the price level itself. To represent price changes without such a comparison is much like measuring the height of waves on a lake where the level is continually changing, not only without having any regard for the differences in level but using at the same time a continually varying yardstick as a unit of measure. Hence the first comparison is that between the general price level of all commodities and the cotton-class level.

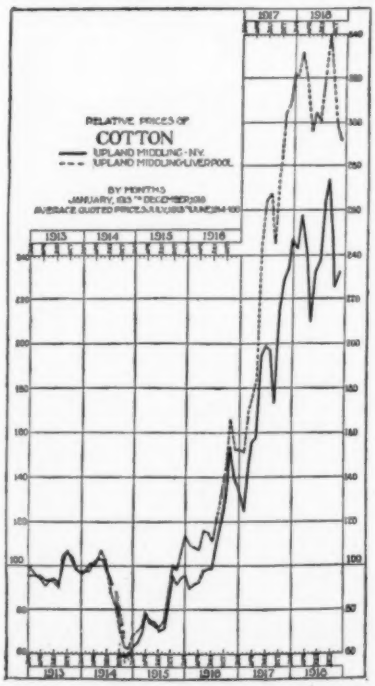
For many purposes it would be advantageous to represent the general price level by 100 at all times and to reduce all other prices to percentages of that base. This method of presentation will be applied later to cotton, cotton yards, and cotton goods, but as such a method of comparison is not in general use, the ordinary mode of representation has been adopted in the accompanying chart.



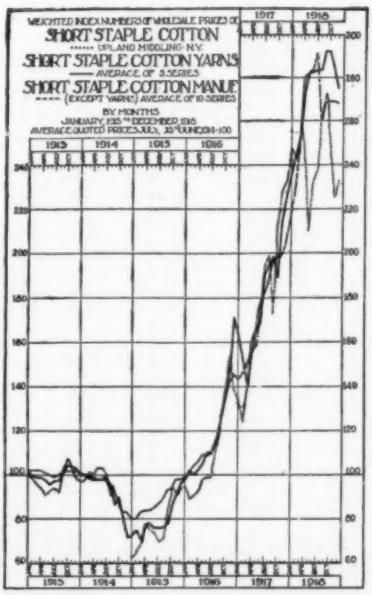
WEIGHTED INDEX NUMBERS OF WHOLESALE PRICES.—Long Staple Cotton, average of 4 series; Long Staple Cotton Yarns, average of 7 series; and Long Staple Cotton Manufactures (except yarns), average of 13 series.—By months, January, 1913, to December, 1918. (Average quoted prices, July, 1913, to June, 1914=100.)



RELATIVE PRICES.—Sea Island Cotton, extra choice, Savannah; Sea Island Weaving Yarn, single combed, 80s; and Cotton Tire Fabrics, 17¼ oz., combed.—By months, January, 1913, to December, 1918. (Average quoted prices, July, 1913, to June, 1914=100.)



RELATIVE PRICES.—Cotton; Upland Middling, New York, and Upland Middling, Liverpool.—By months, January, 1913, to December, 1918. (Average quoted prices, July, 1913, to June, 1914=100.)



WEIGHTED INDEX NUMBERS OF WHOLESALE PRICES. — Short Staple Cotton, Upland Middling, New York; Short Staple Cotton Yarns, average of 5 series; and Short Staple Cotton Manufactures (except yarns), average of 19 series.—By months, January, 1913, to December, 1918. (Average quoted prices July, 1913, to June, 1914=100.)

COMPARISON OF THE PRICE MOVEMENTS OF THE COTTON CLASS AND OF "ALL COMMODITIES."

It may be noted:

(1) That, as was expected, the minor fluctuations of the Cotton Class were more frequent and more pronounced than those of the general price level.

(2) That the low prices of cotton and cotton goods prevailing from July, 1914, to July, 1916, had no counterpart in the general price level, and were consequently a result of forces acting on the Cotton Class as such and not of those affecting the price level in general.

(3) That the rise in prices of the Cotton Class, which started in 1915, began earlier, proceeded faster, had more frequent and more extensive reactions, and finally continued further than that of prices in general.

COMPARISON OF THE PRICE MOVEMENTS OF COTTON, COTTON YARNS, AND COTTON MANUFACTURES.

It is found:

(1) That the fluctuations were most pronounced for cotton and least pronounced for cotton goods.

WHOLESALE PRICES OF COTTON AND COTTON PRODUCTS, BY MONTHS AND YEARS, 1913-1918.

	Cotton yarns.				Cotton manufactures (except yarn).							
	Long staple.				Short staple.				Long staple.	Sea Island.		
	Weaving yarns.					Duck.		Drills.				
	24/1, Eastern Peeler Cones, Carded.	50/2, Eastern Peeler Cones, Combed.	80/2, Eastern Peeler Cones, Combed.	Sea-Island Weaving Yarn, 80/1, Combed.	Sheeting, Brown, 36 in., 60x56, 4 yds.	Standard U. S. Army, Firsts, 28½ in., 8 oz.	Wide numbered Firsts, 60 in., No. 8.	Used by Army, unbleached, 36 in., 66x56, 7 oz. (and substitutes),	Twill, 29.5 in., 104x48, 2.15 yd., 4-leaf.	Aeroplane cloth, standard 36-in.	Balloon cloth, standard B. B., 43-in.	Tire Fabric, 17¼ oz., Combed.
Market	Boston.	Philadelphia, New York and Providence.	Philadelphia, New York and Providence.	Boston.	New York.	Commercial.	Commercial.	.....	Converting Trade.	Boston.	Boston.	New York.
Unit	Pound.	Pound.	Pound.	Pound.	Yard.	Yard.	Yard.	Yard.	Yard.	Yard.	Yard.	Sq. yd.
Base price....	$0.2590	$0.5100	$0.7483	$0.7325	$0.0606	$0.1550	$0.3600	.....	$0.1251	.....	.....	$0.5788
1913—Year	.2598	.5008	.7660	.7708	.0614	.1550	.5950	.....	.1231	.....	.....	.5957
January	.2800	a.4450	c.8000	.8050	.0638	.1550	.6300	.....	c.1225	.....	.....	.6440
February	.2800	a.4450	c.8000	.8050	.0625	.1550	.6300	.....	c.1225	.....	.....	.6340
March	.2525	.5200	.8000	.7850	.0625	.1550	.6300	.....	.1225	.....	.....	.6250
April	.2525	.5200	.8000	.7850	.0613	.1500	.6300	.....	c.1225	.....	.....	.6110
May	.2575	.5100	.7600	.7850	.0600	.1550	.6300	.....	.1200	.....	.....	.5900
June	.2525	.5100	.7600	.7850	.0600	.1550	.6300	.....	c.1200	.....	.....	.5820
July	.2450	.5100	.7600	.7850	.0588	.1550	.5600	.....	.1200	.....	.....	.5780
August	.2450	.5100	.7600	.7850	.0588	.1550	.5600	.....	.1200	.....	.....	.5740
September ...	.2450	.5100	.7600	.7850	.0613	.1550	.5600	.....	.1250	.....	.....	.5660
October	.2725	.5100	.7600	.7150	.0625	.1550	.5600	.....	.1275	.....	.....	.5920
November ...	.2725	.5100	.7600	.7150	.0625	.1550	.5600	.....	c.1275	.....	.....	.5820
December ...	.2625	.5100	.7400	.7150	.0625	.1550	.5600	.....	c.1275	.....	.....	.5710
1914—Year	.2471	.4883	.7267	.7067	.0560	.1463	.5100	.....	.1194	.....	.....	.5622
January	.2625	.5100	.7400	.7150	.0625	.1550	.5600	.....	.1250	.....	.....	.5606
February ...	.2625	.5100	.7400	.7150	.0613	.1550	.5600	.....	c.1250	.....	.....	.5740
March	.2625	.5100	.7400	.7150	.0600	.1550	.5600	.....	.1275	.....	.....	.5870
April	.2625	.5100	.7400	.7150	.0588	.1550	.5600	.....	c.1275	.....	.....	.5949
May	.2625	.5100	.7400	.7150	.0588	.1550	.5600	.....	c.1275	.....	.....	.5902
June	.2525	.5100	.7400	.7150	.0588	.1550	.5600	.....	.1212	.....	.....	.5862
July	.2600	.5100	.7400	.6950	.0588	.1550	.5600	.....	c.1212	.....	.....	.5820
August	.2600	.5100	.7400	.6950	.0575	.1400	.4800	.....	c.1212	.....	.....	.5820
September ...	.2450	.5100	.7400	.6950	.0550	.1400	.4800	.....	c.1212	.....	.....	.5606
October	.2250	.4800	.7100	.6950	.0500	.1400	.4800	.....	.1075	.....	.....	.5201
November ...	.2050	.3950	.6750	.6950	.0450	.1250	.3800	.....	.1037	.....	.....	.5040
December ...	.2050	.3950	.6750	.7150	.0450	.1250	.3800	.....	c.1037	.....	.....	.5148
1915—Year	.2183	.4408	.7150	.7875	.0516	.1279	.4642	.....	.1038	.....	.....	.6105
January	.2050	.3950	.6750	.7150	.0438	.1250	.3800	.....	.1000	.....	.....	.5255
February	.2050	.3950	.6750	.7250	.0450	.1250	.3800	.....	.1000	.....	.....	.5280
March	.2050	.3950	.6750	.7250	.0463	.1250	.3800	.....	c.1000	.....	.....	.5330
April	.2150	.3950	.6750	.7550	.0488	.1200	.4000	.....	.1025	.....	.....	.5714
May	.2150	.4050	.6850	.8050	.0475	.1200	.4200	.....	c.1025	.....	.....	.6440
June	.2150	.4050	.6850	.8050	.0475	.1200	.4400	.....	c.1025	.....	.....	.6410
July	.2150	.4050	.6850	.8050	.0525	.1200	.4400	.....	.1025	.....	.....	.6410
August	.2050	.4050	.6850	.8050	.0550	.1300	.4800	.....	.1000	.....	.....	.6110
September ...	.2050	.4850	.7750	.8050	.0600	.1300	.5200	.....	c.1000	.....	.....	.5950
October	.2250	.5350	.8350	.8050	.0575	.1400	.5500	.....	.1100	.....	.....	.6790
November ...	.2550	.5350	.7650	.8500	.0575	.1400	.5900	.....	.1125	.....	.....	.6650
December ...	.2550	.5350	.7650	.8500	.0575	.1400	.5900	.....	c.1125	.....	.....	.6920
1916—Year	.3210	.7058	.9925	1.0587	.0722	.1719	.6557	.....	.1354	.....	.....	.9054
January	.2650	.5750	.8050	.8900	.0588	.1450	.5900	.....	.1175	.....	.....	.7650
February	.2850	.5750	.8050	.9200	.0600	.1450	.5900	.....	.1200	.....	.....	.7850
March	.2750	.5750	.8050	.9600	.0600	.1450	.5900	.....	c.1200	.....	.....	.7650
April	.2750	.5750	.8050	.9600	.0625	.1450	.5900	.....	c.1200	.....	.....	.7650
May	.2825	.6100	.9550	1.0100	.0663	.1600	.5900	.....	.1350	.....	.....	.7550
June	.2925	.6400	.9850	1.0100	.0663	.1600	.5900	.....	.1350	.....	.....	.7750
July	a.2925	.6750	1.0250	1.0100	.0663	.1800	.6300	.....	.1400	.....	.....	.8300
August	.2950	.7350	1.0250	1.0100	.0725	.1800	.6300	.....	c.1400	.....	.....	.9000
September ...	.3350	.7350	1.0250	1.0100	.0775	.1900	.6700	.....	c.1400	.....	.....	.9250
October	.3800	.8750	1.1750	1.2750	.0850	.2000	.7600	.....	.1525	.....	.....	1.0500
November ...	.4150	.9250	1.2250	1.2750	.0925	.2125	.8233	.....	c.1525	.....	.....	1.2500
December ...	.4600	.9750	1.2750	1.3750	.0988	.2000	.8150	.....	c.1525	.....	.....	1.3000
1917—Year	.4913	.9333	1.2917	1.4250	.1183	.2727	1.0031	$0.1750	.2144	$0.5917	.....	1.5542
January	.4650	1.0250	1.3250	1.4250	.0988	.2000	.7650	.....	c.1525	.....	.....	1.3000
February	.4400	.9250	1.2250	1.4250	.0988	.2000	.7650	.....	.1725	.....	.....	1.3000
March	.4200	.8750	1.1750	1.4250	.1025	.2125	.7650	.....	.1725	.....	.....	1.5000
April	.4200	.8250	1.1250	1.4250	.1050	.2500	.8675	.....	.1775	.....	.....	1.5500
May	.4350	.8750	1.2500	c1.4250	.1100	.2500	.9200	.....	.1925	.....	.....	1.5250
June	.4350	.8750	1.2500	c1.4250	.1175	.2750	1.0700	.1488	c.1925	.....	.....	1.6250
July	.5300	.9250	1.3250	c1.4250	.1200	.3000	1.2250	.1717	.2450	.....	.....	1.6250
August	.5500	.9750	1.3750	c1.4250	.1225	.3000	1.2250	.1717	.2450	.....	.....	1.5500
September ...	.5500	.9750	1.3750	c1.4250	.1225	.3000	1.2250	.1836	.2450	.....	.....	1.5500
October	.5300	.9750	1.3500	c1.4250	.1350	.3000	1.0700	.1780	c.2450	.5750	.....	1.8000
November ...	.5550	.9750	1.3500	c1.4250	.1400	e.3425	e1.0700	.1857	.2575	.6000	.....	1.6750
December ...	.5650	.9750	1.3750	c1.4250	.1475	.3425	1.0700	.1918	.2750	c.6000	.....	1.6500
1918—Year	.6954	1.1763	1.6563	1.4250	.1948	.3400	1.1508	.2212	.3113	.6250	$0.6053	1.7150
January	.6000	1.0100	1.5100	c1.4250	.1650	.3425	1.0700	.1957	c.2750	.6000	.....	1.7750
February	.6150	1.0100	1.5100	c1.4250	.1750	.3425	1.0700	.1970	c.2750	c.6000	.....	1.7500
March	.6150	1.0100	1.5100	c1.4250	.1875	.3425	1.0700	.2036	.3150	c.6000	.....	1.7500
April	.6550	1.1250	1.5100	c1.4250	.2250	.3425	1.0700	.2011	c.3150	.6250	.5787	1.7500
May	.7100	1.1250	1.5250	c1.4250	.2300	.3425	1.0700	.2094	.3250	c.6250	c.5787	1.7000
June	.7100	1.1250	1.5000	c1.4250	.2300	.3425	1.0700	.2210	c.3250	c.6250	.6000	1.7750
July	.7200	1.1250	1.5250	c1.4250	.2300	f.3350	f1.2100	.2380	c.3250	c.6250	c.6000	1.7000
August	.7200	1.1250	1.5250	c1.4250	d.1750	.3350	1.2100	.2446	c.3250	c.6250	c.6000	1.7800
September ...	b.7500	b1.3650	b1.9400	c1.4250	d.1800	.3350	1.2100	.2523	c.3250	c.6250	c.6000	1.6500
October	.7500	1.3650	1.9400	c1.4250	.1800	.3350	1.2100	.2492	c.3250	.6500	.6300	1.6500
November ...	.7500	1.3650	1.9400	c1.4250	.1800	.3425	1.2750	.....	.3025	c.6500	c.6300	1.6500
December ...	.7500	1.3650	1.9400	c1.4250	.1800	.3425	1.2750	.....	c.3025	c.6500	c.6300	1.6500

a Carded. *b* Price fixed by the Government after August 14, 1918. *c* Interpolated. *d* Government net price. *e* From November, 1917, sales restricted to Government. *f* From June 21, 1918, prices fixed by the Government.

(2) That price fluctuations occurred most often in the following order: First in cotton, second in yarns, and last in fabrics; but that no general rule as to sequence was followed.

(3) That the great fall in the prices of cotton in the spring of 1918 had no counterpart in the prices of yarns and fabrics. This decline in cotton prices was probably due to the unfavorable military situation which brought with it the threat to shipping and to the prospect of price-fixing. These forces naturally did not have a similar effect on the prices of yarns and fabrics.

(4) That the fall in prices in the early part of the period was greatest for cotton, less for yarns, and least for fabrics, while the rise in prices for the latter part of the period was least for cotton, more for yarns, and greatest for fabrics.

In order to bring out more clearly the relative positions of the raw, intermediate, and finished products and to get a basis for quantitative comparison, the cotton curve, the cotton yarn curve, and the cotton manufactures curve will each be divided (ordinate for ordinate) by the general price curve. The quotients thus derived will represent the rise in prices of each of these classes of products in terms of an all-commodity standard of value.

The fourth chart of page 489 shows:

For cotton.—(1) That the drop in prices in 1914 below the general level was greater than the rise above that level in 1918.

(2) That the period for which prices were substantially under the general level was somewhat longer than that for which they have been above.

(3) That assuming a uniform distribution of sales by the producers, the net loss resulting from the low prices in the earlier period was greater than the net gain in the later period.

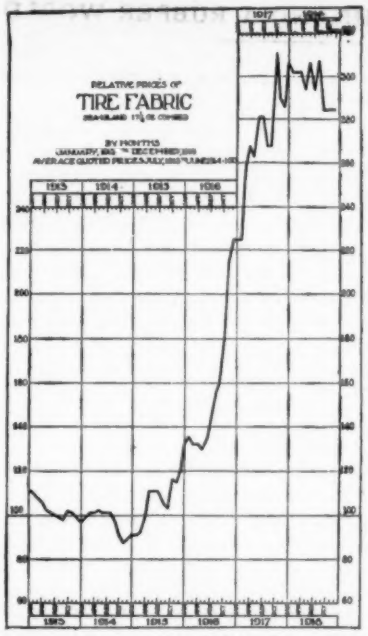
(4) That since the lowest price (below the general level) came in the fall of 1914 and the early spring of 1915, the months when the bulk of the crop was being sold, the balance of loss over gain is larger than appears from a cursory glance at the chart.

For cotton yarns.—(1) That the decrease in prices in 1914 compared with the general level was much less than the rise above that level in 1918.

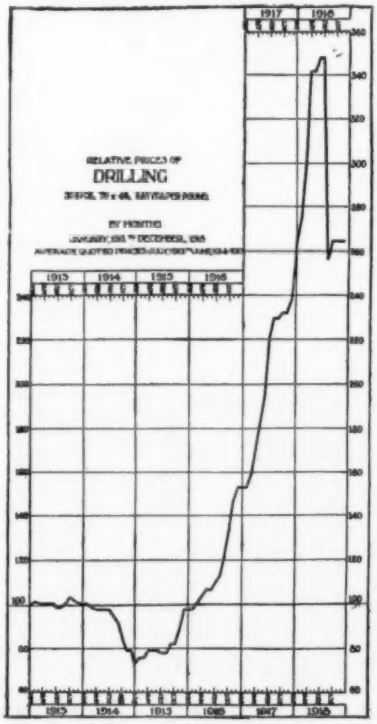
(2) That the period for which prices were under the general level was substantially equal to that for which they were above.

For cotton manufactures.—(1) That the fall in prices in 1914 below the general level was slight compared to the rise above that level in 1918.

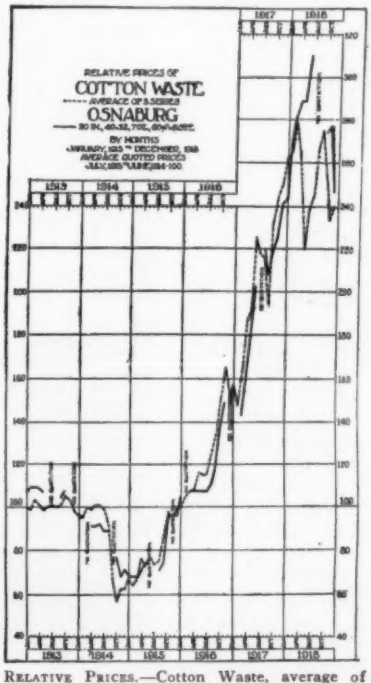
(2) That as was the case for yarns, the period for which prices were under the general level was substantially equal to that for which they were above.



RELATIVE PRICES.—Tire Fabric, Sea Island, 17¼ ounce, combed.—By months, January, 1913, to December, 1918. (Average quoted prices, July, 1913, to June, 1914=100.)



RELATIVE PRICES.—Drilling, 30 inch, 70 x 48, 2.85 yards per pound.—By months, January, 1913, to December, 1918. (Average quoted prices, July, 1913, to June, 1914=100.)

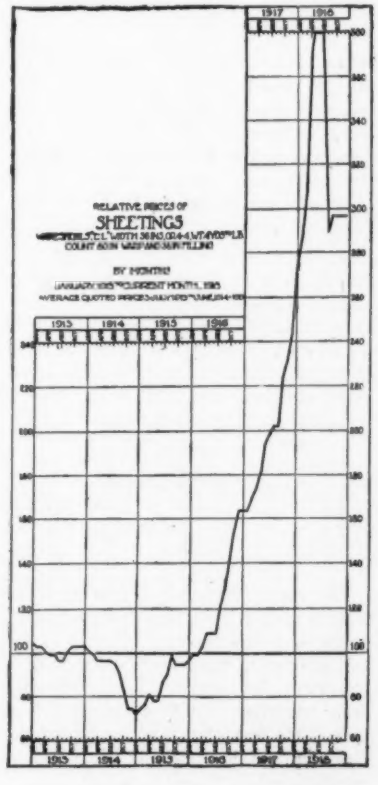


RELATIVE PRICES.—Cotton Waste, average of three series; and Osnaburg, 30 inch, 40 x 32, 7 ounce, 60 per cent waste.—By months, January, 1913, to December, 1918. (Average quoted prices, July, 1913, to June, 1914=100.)

COMPARISON OF THE PRICE MOVEMENTS OF RAW MATERIALS.

SHORT STAPLE, LONG STAPLE, SEA ISLAND.—It should be noted—

(1) That the price movements of short-staple and long-staple cotton were very similar throughout the period, with, however, more pronounced fluctuations in the former. This tendency is probably to be explained by the greater sensitiveness of a



market dominated by transactions on a central exchange.

(2) That the price fluctuations of sea-island cotton were similar to those of the other cottons for the early part of the period, but that prices began to rise faster and farther after the end of 1914, probably as a result of the difficulty of importing Egyptian Sakellarides, almost a perfect substitute, and the great war demand for the longest staple cottons for use in manufacturing automobile tires, balloon cloth, and other fabrics of great strength.

UPLAND MIDDLING COTTON, AT NEW YORK AND LIVERPOOL. It should be noted—

(1) That the fluctuations were entirely similar until the latter part of 1914, when the fall in price at New York exceeded that at Liverpool, probably as a result of adverse exchange rates and anticipated shortage of ocean transportation.

(2) That beginning in the fall of 1915, the differences in prices gradually increased. This increase can probably be largely explained by high freight and insurance rates and difficulties in shipping.

COMPARISON OF THE MOVEMENT OF PRICES OF RAW MATERIALS WITH THOSE OF INTERMEDIATE AND FINISHED PRODUCTS.

SHORT-STAPLE COTTON, YARNS, AND MANUFACTURES. It should be noted—

(1) That the fluctuations were the most pronounced for cotton, and the least pronounced for cotton goods.

(2) That in 1914 the fall in prices was greatest for cotton and least for fabrics; while in 1918, the rise in prices was greatest for yarn and least for cotton.

(3) That no rule can be laid down as to the order in which the fluctuations occurred, but that in general the change in price whether rise or fall occurred first with the raw material and later with the intermediate and finished products.

LONG-STAPLE COTTON, YARNS, AND MANUFACTURE. From chart, page 491, it is seen:

(1) That the fluctuations were the most pronounced for the raw material and least pronounced for the finished product.

(2) That in 1914, the fall in price was greatest for cotton and least for fabrics, while in 1918, the rise in price was greatest for yarn and least for cotton.

(3) That in general fluctuations occurred first in the cotton, next in the yarns, and finally in the fabrics—but that this sequence was not invariable.

SEA ISLAND COTTON, YARNS, AND MANUFACTURES. It is seen:

(1) That unlike the two cases just discussed, the rise was higher for the cotton than for the finished fabric, and for the finished fabric in turn than for the yarn.

(2) That no rule can be established as to the order in which fluctuations occurred.

COTTON WASTE AND OSNABURG. From the chart, page 493, it is seen:

(1) That the price movements for the raw and finished products were very similar.

(2) That the fluctuations in the prices of cotton waste were more pronounced than were those of osnaburg.

(3) That in practically every case the fluctuation occurred first in the price of the raw material.

PRICE TABLES.

The price quotations contained in the accompanying tables have been secured from the Bureau of Labor Statistics, financial papers, trade journals, and private firms. In each case an attempt has been made to select not only the most reliable source but also the most representative market. For example: for short-staple cotton, Liverpool, New York, and New Orleans were chosen as markets; while for Sea Island, Savannah was chosen; and for long-staple varieties, New Bedford. Also each article, for which a series of price quotations has been carried, was selected to represent the price movement in the class to which it belongs.

The prices of cotton are monthly averages of weekly quotations; prices of all other commodities were taken but once a month, and, with few exceptions, represent the market during the first week of the month.

Cotton in British Africa.

THE ELIMINATION of Germany from Africa leaves England free to develop the resources of the continent, particularly in the southern, central and eastern portions, without fear of interference. It leaves her free, for instance, to continue and strengthen the effort to free herself from dependence on the United States for cotton, which started the cultivation of that staple in Nyasaland at the beginning of the century.

An optimistic report on the present condition and on the prospects of cotton cultivation in that country, recalls the marvellous story of the growth of rubber culture in England's African possessions. European cultivation began in 1903 and soon after the high prices of cotton led the Lancashire mill owners to try to do without American cotton and to encourage its growth elsewhere. The British Cotton Growers' Association was formed and took Nyasaland with other districts under its wing. The record of exportation since is:

	Pounds.	Value.		Pounds.	Value.
1902	962	.....	1910	1,736,999	£58,687
1903	56,897	£1,778	1911	1,359,904	44,199
1904	285,185	5,941	1912	3,237,555	80,939
1905	776,640	16,180	1913	2,401,142	65,486
1906	526,119	15,345	1914	2,648,508	72,068
1907	403,486	13,998	1915	3,065,248	68,586
1908	756,120	28,335	1916	3,462,478	127,131
1909	858,926	26,209			

The cotton grown is known as Nyasaland upland and comes from a long-stapled American variety. The seed was originally imported by the Zambesi Industrial Mission; it was acclimated and selected as the kind to grow after long experimentation with Egyptian, Sea Island, Indian, Brazilian, American upland and other varieties. At first they raised Egyptian on land of less than 2,000 feet elevation and Nyasaland up to 3,000 feet; now Egyptian has been wholly discarded and only Nyasaland from carefully selected seed is raised.

The number of acres now under cultivation and the estimated possible area are:

	Under Cultivation. Acres.	Possible Extension. Acres.
Shiré Valley	13,450	218,000
Shiré Highlands	19,000	291,000
Lake Nyasa	400	800,000
	32,850	1,309,000

The natives take easily to cotton raising. There is a fair amount of native labor for the European plantations and many

(A. Livingston Bruce.)

A NYASALAND COTTON ESTATE. PICKERS BRINGING IN COTTON.

are beginning to raise cotton independently, but the planters count on modern machinery for the development and above all need improved transportation within the colony.

What the Rubber Chemists Are Doing.

EXTRACTION OF RUBBER GOODS.[1]

IN RUBBER ANALYSIS, where rubber is determined indirectly, as the difference between 100 per cent and the sum of the organic extracts, ash, and total sulphur, it is important that the extracts represent as much as possible of the organic materials which were added to the rubber batch and which are not determined separately. Those who have tried to extract glue from a vulcanized compound containing it, by means of boiling water, know how tenaciously rubber clings to certain admixed materials. In this work it was our intention to ascertain as far as possible how much, if any, soluble organic material is retained in a compound after it has been extracted with acetone for eight hours and chloroform for four hours in the usual way.

The results obtained by successive extractions of cheap rubber mixtures containing mineral rubber and pine tar demonstrated that in the case of cheap compounds, the figure for rubber obtained by the "difference" method cannot be reliable at all, because of the retention of the organic material unextracted. As long as the ashing method is used it is clear that an accurate figure for rubber cannot be expected for this reason. At best it can be but an approximation.

Finding that such mixtures as acetone, carbon bisulphide, and acetone-chloroform, were more effective than the simple solvents in washing residues on Gooch pads, it occurred to us that if a constant boiling mixture of these solvents could be obtained, this mixture might find application in the extraction of rubber goods in the Soxhlet.

Ryland[2] found that a mixture of 55 per cent carbon bisulphide and 45 per cent acetone by volume has a constant boiling point of 39.25 degrees C. Likewise a mixture of 68 per cent chloroform and 32 per cent acetone by volume boils constantly at 64.7 degrees C. Accordingly, it was decided to extract samples of cheap rubber with acetone for eight hours, and then with such a constant boiling mixture, and compare the weight of extract so obtained with that obtained by means of pure carbon bisulphide, or pure chloroform.

From the results obtained, it is plain that chloroform is slightly better than carbon bisulphide as a solvent for extracting rubber, while the constant boiling mixture, whether it be 55 per cent carbon bisulphide, 45 per cent acetone or 68 per cent chloroform, 32 per cent acetone, is a much more efficient solvent than either carbon bisulphide or chloroform.

Further, one extraction with a constant boiling mixture may take the place of the two extractions, namely, acetone for eight hours, followed by chloroform for four hours, according to common practice in the rubber laboratory to-day. To ascertain whether such a substitution would be possible, the following mixture was made by distilling a mixture of 55 per cent by volume of carbon bisulphide and 45 per cent by volume of acetone over copper at a temperature of 39.25 degrees C. The solvent therefore contained no sulphides or free sulphur so that sulphur determined in the extracts could not be attributed to the solvent. Likewise, the mixture of 68 per cent by volume of chloroform and 32 per cent by volume of acetone was freshly distilled, and contained no sulphur.

A study of the results with these mixed solvents reveals that:

(a) A small amount of sulphur, usually less than 0.1 per cent is extracted by the chloroform.

(b) About the same amount of sulphur is extracted by the mixture of 55 per cent carbon bisulphide and 45 per cent acetone when it is used in place of chloroform.

(c) Either mixture extracts from the original sample, in eight hours, as much or more material than the sum of the extracts obtained by the eight-hour acetone extraction and the four-hour chloroform extraction.

(d) Either mixture extracts from the original sample, in eight hours, as much or more material than the sum of the extracts obtained by an eight-hour extraction with acetone and a four-hour extraction with a mixture of 55 per cent carbon bisulphide and 45 per cent acetone.

(e) The free sulphur present in the extracts obtained by the use of the mixtures is usually from 0.1 per cent to 0.3 per cent higher than the amount present in the acetone extract.

(f) There seems to be no advantage in extracting 12 hours or longer with the mixed solvents, since the figures are at the maximum in eight hours.

(g) The mixture of carbon bisulphide and acetone does not decompose during the extraction to liberate sulphur or sulphur compounds and in this way affect the free sulphur determination.

(h) The mixture of 68 per cent chloroform and 32 per cent acetone produces heavier extracts than that of 55 per cent carbon bisulphide and 45 per cent acetone.

Determination of the effect of the mixed solvents was made on high-grade stocks for the purpose of ascertaining what varying solvent effect they would have on vulcanized rubber.

Four compounds containing (A) 70 per cent, (B) 85 per cent, (C) 95 per cent and (D) 45 per cent of rubber, respectively, were extracted eight hours with acetone and four hours with chloroform and then one was subjected to four hours' additional extraction with chloroform, another to four hours with 55 per cent carbon bisulphide, 45 per cent acetone, and a third to four hours with 68 per cent chloroform and 32 per cent acetone.

All three solvents dissolve vulcanized rubber to an extent which seems to depend upon how heavily it is compounded. It is interesting to note that the mixture of 68 per cent chloroform —32 per cent acetone exhibits this ability to dissolve rubber to a marked extent. The rubber dissolved by it in the above is nearly twice that dissolved by pure chloroform. On the other hand, the mixture of 55 per cent carbon bisulphide—45 per cent acetone hardly exhibits this ability at all, so that the rubber dissolved by it is inappreciable as compared with that dissolved by chloroform or the mixture of chloroform and acetone. Obviously, this is a point in favor of the use of the mixture of 55 per cent carbon bisulphide—45 per cent acetone.

These results obtained by the carbon bisulphide-acetone mixture on these high-grade compounds are in every case lower than the sum of the acetone and chloroform extracts. The figures for free sulphur are also in accordance with previous statements given here. It is evident, therefore, that it is highly advantageous to use the mixture of carbon bisulphide and acetone to take the place of acetone and chloroform, because of this less active solution effect upon rubber as shown.

Before recommending the adoption of this mixed solvent, a few words must be said about deterioration of the solvent, and blank extracts that will form in it. It was found that the freshly distilled mixture would give no blank, and at the end of two weeks would still give no blank. However, at the end of a month's storage 75 cc. of the mixture would give a residue which, although it contained no sulphur, yet weighed up to 0.006-gram. Therefore, it is advised that where the mixture is being used in large quantities for routine analysis, it be redistilled over copper every week. Where it is used only occasionally, it should be mixed up fresh and distilled before using.

[1] Abstract of paper by S. W. Epstein, assistant chemist, and B. L. Gonyo, laboratory assistant, Bureau of Standards, Washington, D. C., read before the Rubber Division of the American Chemical Society, at Philadelphia, Pennsylvania, September 2-6, 1919.

[2] Ryland, "Journal of the American Chemical Society," 1899, volume 22, page 384. See also Young, "Fractional Distillation," pages 68 and 69.

SUMMARY.

1. Extraction for eight hours with acetone followed by four hours' extraction with chloroform does not remove all soluble material from some rubber compounds.

2. After a rubber sample has been extracted with acetone it was found that:

(a) Chloroform in every case extracted slightly more material than carbon bisulphide.

(b) Constant boiling mixtures such as 55 per cent carbon bisulphide—45 per cent acetone and 68 per cent chloroform—32 per cent acetone extracted from many cheap compounds considerably more material than either chloroform or carbon bisulphide.

3. The constant boiling mixture of 68 per cent chloroform and 32 per cent acetone exhibits a marked ability to dissolve vulcanized rubber, as contrasted to the mixture of 55 per cent carbon bisulphide 45 per cent acetone which hardly exhibits this ability at all.

4. It is recommended that the constant boiling mixture 55 per cent carbon bisulphide and 45 per cent acetone be used in place of acetone and chloroform to extract rubber samples since:

(A) It eliminates one extraction with the necessary weighings.

(B) Extraction is complete in eight hours, while the acetone and chloroform extractions require a total of twelve hours.

(C) The extraction of free sulphur is complete.

(D) A rubber analysis in which the mixed solvent is used is more accurate than that in which acetone and chloroform are used separately because:

I. Little or no rubber is dissolved by this mixture, as compared with chloroform which will in some cases dissolve considerable quantities.

II. The extraction of cheap rubber compounds is more nearly complete, since the extracts obtained are greater than the sum of the acetone and chloroform extracts.

SYNTHETIC RUBBER OF GERMAN MANUFACTURE.

A number of different types of synthetic rubber have been prepared, all of them by the gradual polymerization of butadiene, mono-methyl butadiene (isoprene), or di-methyl butadiene (methyl isoprene). Each of these three original substances yields a different type of synthetic rubber of different composition and properties. Only that obtained from mono-methyl butadiene or isoprene is supposed to give a product of the identical composition of natural rubber, but even this is very doubtful. All the products have properties in some way resembling rubber, but that obtained from di-methyl butadiene, yielding the so-called methyl rubber, was found by the Germans to be the most useful as a substitute for natural rubber, particularly for the manufacture of vulcanite plates for accumulator cells, believed to have been used in large numbers for U-boat equipment.

In many ways these synthetic rubbers behave like a partly vulcanized rubber. Probably oxidation sets in during preparation, and this would be sufficient to account for the semi-vulcanized condition. Thus raw rubber, when mixed with powerful oxidizing agents such as "benzoyl peroxide" and heated, yields a product resembling vulcanized rubber. For this reason the specimens do not dissolve in benzene, cannot be rendered properly plastic on the hot rolls without the addition of aids to plasticity, and vulcanize badly. It is also known that synthetic rubber tends to oxidize in the air, and that to obtain satisfactory vulcanized products, it is necessary to use relatively large quantities of powerful accelerators.

There appears to be no doubt that Germany used large quantities of synthetic rubber, particularly this methyl rubber, during the war, but the product cannot compete with natural rubber either in quality or price under normal conditions. ("The Bulletin of the Rubber Growers' Association," London, Volume 1, No. 3, November, 1919.)

CUMAR RESIN.

Cumar, a synthetic resin produced from coal-tar distillates, is gaining recognition in the rubber industry as a valuable compounding ingredient. Chemically it is a mixture of para-coumarone, para-indene and the polymers of other hydrocarbons found in coal-tar. In appearance cumar resembles ordinary resin, but its properties are radically different. It is uniform in quality, neutral, non-saponifying and non-oxidizing. It is not affected by water, acids, alkalies or salts. Exposure to the air or weather will not change it.

Cumar is soluble in all coal-tar solvents, turpentine, vegetable oils, carbon bisulphide, carbon tetrachloride, ether, acetone and most commercial solvents. It is insoluble in alcohol. Its specific gravity is 1.05-1.15. Nine different grades are available, classified according to melting point, ranging from 50-60 to 145-160 degrees C., and in color from clear light yellow to dark amber, gaged by definite color standards.

The softer grades, melting at 50-60 and 60-70 degrees C., are good solvents for rubber and are useful for softening the gum in the breaking-down operation. The hard grades, melting at 90-100 degrees C., is used extensively as a substitute for Pontianak and similar resins in rubber compounding. Cumar mills readily into the rubber on the rolls and adds tackiness and plasticity to the unvulcanized stock. It is of value also in the manufacture of rubber cements and reclaimed rubber.

VARIABILITY OF CURE OF SLAB RUBBER.

Researches of Dr. H. P. Stevens on the variability of cure of slab rubber show results which negative the conclusions of the agricultural chemist of the Federated Malay States as to the "remarkable uniformity" of slab rubber.

Slab rubber has a repulsive appearance, especially on arrival at destination. The surface is dark and slimy from the exudation of serum. It is usually moldy, and the smell is very offensive. The slab can be washed and crêped on the plantation with a relatively small loss in the rate of cure. The rubber in this form is much more presentable, but the color is dull and the rubber frequently streaked. Experiments on a manufacturing scale have resulted in the production of crêpe from matured coagulum of a uniform pale shade. The color was less bright than that of ordinary crêpe but sufficiently good to pass as standard crêpe. Of three sample cases of crêpe tested, the first cured 34 per cent faster than that prepared ordinarily, two other cases cured 67 and 57 per cent faster, respectively. Hence, although all sample cases contained more rapidly curing rubber and were prepared in the same manner, the rate of cure showed appreciable variation.

SYNTHETIC ACETIC ACID AS A LATEX COAGULANT.

Synthetic acetic acid produced from calcium carbide is not of the purity of that obtained from pyroligneous acid, as the synthetic acid is brown in color and has a distinct odor. It is, however, free from copper and suitable for latex coagulation, as the amounts of brown coloring matter in the acid are not sufficient to affect the color of the finished rubber.

Experimental data show that synthetic acid coagulated specimens of both crêpe and smoked sheet are practically identical with the corresponding samples coagulated with ordinary acetic acid. ("The Bulletin of the Rubber Growers' Association," London, Volume 2, No. 1, January, 1920.)

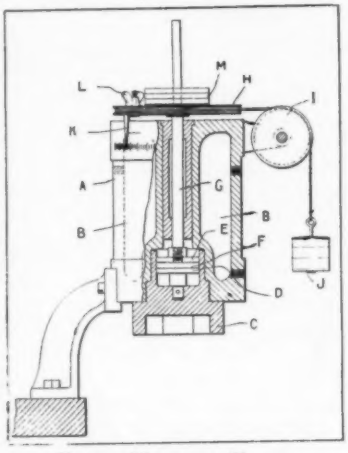
LEAD OLEATE.

A preparation of lead oleate is now on the market for use as a mild accelerator of vulcanization. It is marketed as an oleaginous mass of wax-like consistency, fracture, and melting point. It is non-poisonous, and gives off no fumes. It has no tendency to cause scorching in mixing or calendering. It may be used in conjunction with aniline or hexamethylene tetramine but should not be used with thiocarbanilide.

LABORATORY APPARATUS.

APPARATUS FOR DETERMINING VISCOSITY OF RUBBER.

A NEW MECHANISM for the determination of the viscosity of rubber under varying conditions of temperature and pressure is here illustrated.



RUBBER VISCOSITY TESTER.

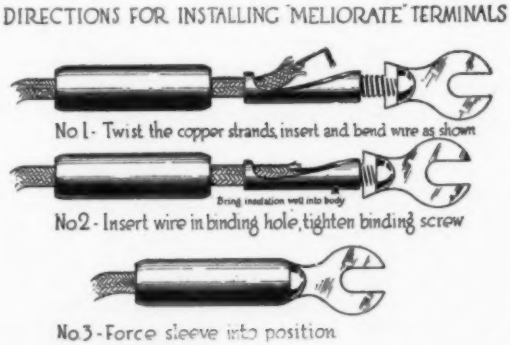
The apparatus comprises a cylinder A bracketed to a table and cored out at B for the circulation of steam. A hole runs axially through the cylinder in which at its enlarged lower end a nut C is screwed holding the fixed lower gripping disk D. Gripping disks D and E are provided with radial teeth for engaging the test sample F. The upper disk E is attached to the vertical spindle G, which is made to turn by a cord passing around the grooved horizontal pulley H, thence over the pulley I and suspending weight J. The angle of rotation is indicated by a pointer K attached to the horizontal pulley H. The location of the pointer is adjustable by the thumb nut L. The pressure upon the sample F under test is regulated by weights M placed over the extension of the spindle.

Stocks of a certain grade should show a definite travel for known conditions of pressure, torsion, temperature and time; these being known for standard stocks, a comparison of samples is easy. It is the viscosity of the rubber which permits the larger part of the movement indicated on the scale.

The coefficient of viscosity may be determined directly by this apparatus. A calibration chart can be prepared, showing the coefficient of viscosity corresponding to different amounts of travel of the pointer in a unit of time for different conditions of pressure, torsion and temperature, and, those conditions being known and the travel of the pointer determined, the coefficient of viscosity for the sample in hand may be read directly from the chart. (Ralph B. Naylor, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls—both in Massachusetts. United States patent No. 1,327,838.)

SOLDERLESS TERMINALS.

Electrical connections that are intended to be permanent or perfect or both, are made by the use of solder. Such a connection, however, is subject to impairment when under strain.


DIRECTIONS FOR INSTALLING 'MELIORATE' TERMINALS
No 1 - Twist the copper strands, insert and bend wire as shown
Bring insulation well into body
No 2 - Insert wire in binding hole, tighten binding screw
No 3 - Force sleeve into position

The solderless terminal overcomes all the inconveniences inherent in the soldered connector, and is unique in design and execution. It is known as the "Meliorate Terminal," and its construction and method of use are clearly shown in the illustration. Polarity is indicated by a black or red sleeve of a hard, strongly dielectric material that can withstand the hardest usage. (Standard Scientific Co., 70 Fifth avenue, New York.)

CHEMICAL PATENTS.

THE UNITED STATES.

LEATHEROID AND PROCESS OF MANUFACTURE, comprising an admixture of leather, rubber, casein and an alkali earth metal oxide. (Bernhard Fritzsch, Cincinnati, Ohio. United States patent No. 1,334,297.)

METHOD OF RECLAIMING RUBBER, consisting in dividing the rubber into pieces, placing it loosely in a chamber, expelling the air from the chamber by the injection of steam under pressure, and heating the rubber while in a loose condition in the chamber by an externally applied source of heat. (Douglas Frank Twiss, assignor to The Dunlop Rubber Co., Limited—both of Birmingham, England. United States patent No. 1,335,926.)

RUBBER PRODUCT AND COMPOSITION. As new compositions of matter, solutions containing in a common solvent, more than 50 per cent of rubber and from about ten to 30 per cent of a semi-solid to solid bitumen obtainable by the destructive distillation of coal tar pitch. (John M. Weiss, assignor to the Barrett Co.—both of New York City. United States patent No. 1,334,060.)

THE UNITED KINGDOM.

VULCANIZABLE CONDENSATION PRODUCTS.—Obtained by passing a vaporized mixture containing dienes such as isoprene, for example, the mixture of gases and vapors obtained by cracking mineral oil under high pressure, over a heated contact mass (bauxite, fuller's earth, clay, animal or vegetable charcoal, etc.) at a temperature above the melting-point of the resin formed, say from 110 to 250 degrees C.; the molten resin is drawn off from the bottom of the contact vessel and solidified. The product is soluble in alcohol or ether, and may be used in the manufacture of varnishes, coating compositions, plastic compositions, insulating materials, etc., and may be vulcanized. (Hall Motor Fuel, Limited, Pinners Hall, Austin Friars, London, England. [H. V. Dunham, Brattleboro, Vermont, U. S. A.] British patent No. 138,046.)

THE FRENCH REPUBLIC.

RUBBER COMPOUND.—An improved process for the manufacture of rubber compounds. (N. D. Nielsen. French patent No. 500,174.)

AUSTRALIA.

RUBBER SUBSTITUTE.—The process and product which consists in combining fish oil and sulphur in the presence of heat and resubjecting the resultant combination to heat under pressure. (Morton Gregory, assignor to Western Rubber Co., both of Tacoma, Washington. Australian patent No. 5,882.)

PRESERVATION OF RUBBER.—A process for preserving india rubber. (F. E. Stowe, New South Wales. Australian patent No. 3,364.)

GERMANY.

SPONGE RUBBER.—Coagulating rubber latex under conditions producing a porous or spongy coagulum and fixing the pores by vulcanization. (Philip Schidrowitz and H. A. Goldsborough, London, England. German patent No. 321,092.)

AMERICAN-MADE FILTER PAPER

Acid-washed filter paper for quantitative chemical analysis, which paper was formerly imported, is now being made by a small paper-making plant in New England, which is said to have capacity for this purpose more than sufficient to meet the entire American demand.

AMERICAN CHEMICAL SOCIETY.

RUBBER DIVISION MEETING.

THE SECOND MEETING of American rubber chemists, organized as the Rubber Division of the American Chemical Society, took place at the fifty-ninth meeting of the society at St. Louis, Missouri, April 14-15, 1920.

Brief abstracts of the papers presented at the Rubber Division meeting are given below:

BROMINE ADDITION TO RUBBER.

When rubber is treated with bromine, both addition and substitution occur but by determining these separately the unsaturation is found to be one double bond for each isoprene unit. —W. K. Lewis and William H. McAdams.

RECOVERY OF VOLATILE SOLVENTS.

Solvents can be recovered by absorption, compression or refrigeration. Each method has its own distinctive field. These fields are brought out and the chief features of each method are also emphasized.—W. K. Lewis.

THE DETERMINATION OF TRUE FREE AND TRUE COMBINED SULPHUR.

Sulphur is considered present as free and combined. Acetone soluble sulphur may be partly combined with resins, etc., as may the sulphur insoluble in acetone, heretofore considered as combined with rubber. The total acetone extract is soluble in alcohol, but if alcohol saturated with sulphur is used, none of the truly free sulphur will dissolve and hence can be separated from the remainder of the extract. Results show about 0.4 per cent sulphur combined with resins.

About 85 per cent of *Hevea* resins are saponifiable and hence any resinous sulphur compounds insoluble in acetone may be soluble in alcoholic potash. Acetone extracted sample is boiled 8 hours with alcoholic potash and about 0.25-0.30 per cent sulphur extracted.

So far only pure gum stocks have been investigated.—W. J. Kelly.

SMALL AMOUNTS OF MAGNESIA AND CERTAIN ORGANIC SUBSTANCES AS ACCELERATORS.

The activity of small amounts of extra light magnesia was compared with the effect of similar amounts of certain organic substances. The load required to effect a given extension was found to be fair measure of the rate of cure of the mixture which contained magnesia. This was not found to be true for the mixtures containing the organic accelerators. The accelerating activity of magnesia in small amount was found to be of secondary character, acting in conjunction with certain extraneous substances, probably nitrogeneous, present in the rubber. The amount of these extraneous substances was found to limit the activity of magnesia as an accelerator.—G. D. Kratz and A. H. Flower.

OBSCURING POWER OF PIGMENTS.

The fineness of pigments can be determined by measurements of turbidity and be expressed in absolute units.—W. K. Lewis.

EFFECT OF COMPOUNDING INGREDIENTS.

Compounding experiments in which up to 50 volumes of filler were added to 100 volumes of rubber are described. The values of tensile strength are also corrected for actual volume of rubber present. Tensile strength calculated on area at rest is unfair to pure gum stocks. Tensile at break is suggested as a better means of comparison. This is calculated on the actual cross section at break rather than on the original cross section. A correction factor, due to volume increase during stretching, is also involved. A visual picture of the structure of rubber is given. This is based on the hypothesis that large colloidal aggregates function as elastic fibers and the smaller as plastic material. Vulcanization is said to lock up these fibers to form a network.—C. O. North.

PHYSICAL TESTING OF RUBBER GOODS.

The report of the Committee on the Physical Testing of Rubber Goods was accepted as it stands with the understanding that this committee will attempt to correlate its work with the various other technical societies in the country in order to get unit specifications agreeable to all.

A METHOD FOR THE DETERMINATION OF PERMANENT SET ON VULCANIZED RUBBER GOODS.

Before vulcanization, rubber compounds are plastic. During the cure they are changed to a more or less elastic state. However, there is always a certain residuum of plasticity in the cured compounds. In addition to this there is undoubtedly an arrangement of the elastic material which may be likened to a network of fibers which do not all lie in a line with the direction of the stretching. Under tension these fibers are straightened out and do not again return to their original positions. There is evidence that these fibers may be of irregular shapes, having bends or knuckle-like projections such that in one stretch these projections will cause the fibers to catch, but upon release of tension this hold will be loosened so that on another stretch measurably more elongation will be produced by the same tension. If these elastic fibers are stretched beyond their elastic limit, some of the bonds will be broken causing an apparent set which should not be counted against the stock. The set test then should be such that it will bring out the inelasticity caused in the stock, (1) by plastic flow, (2) complete straightening of the fibers, including those tangled.

Three methods have been considered for accomplishing this, the possibilities of which may be summed up as follows:

(A) Decrease in tension under given constant elongation.

This method shows no advantage and results do not indicate any direct association with the thing we wish to measure; it is a case of measuring length by units of weight. The test involves expenditures of time and money, which render it impractical.

(B) Increase in elongation against time under constant load.

Reliable results can only be obtained by repeated applications of the load, each of which should remain on the piece for a matter of hours. In spite of its merits, this test was therefore abandoned because it was considered impractical.

(C) Stretching for a given period of time to a given elongation, releasing, resting, and repeating until there is no further set.

The most practical method for measuring set reliably by this method was worked out as follows:

Compounds were selected representative of pure gum, cheap friction, high and low gravity tread, cheap tread, and cheap mechanical goods stocks. Four each of these pieces were stretched to ten per cent of the breaking elongation four times, held for ten minutes each time, rested ten minutes between stretches and finally ten minutes after the final release the set was measured. The results appear in Table I.

TABLE I. PERCENTAGES OF SET.

	Per Cent Elongation.							
	10.	20.	30.	40.	50.	60.	70.	80.
Pure gum	0.0	0.0	2.0	8.0	6.0	6.0	8.0	16.0
Cheap friction	0.0	1.0	3.0	6.4	8.5	16.5	27.5	....
Friction	0.0	0.0	4.0	0.0	1.0	8.0	20.0	24.0
Low gravity tread	0.0	1.0	7.0	10.0	17.0	25.5	41.0	51.0
High gravity tread	0.0	1.0	7.0	12.6	19.0	29.5	59.0	53.5
Cheap tread	0.3	2.0	6.0	12.5	27.5	33.5	40.0	34.5
Mechanical	1.0	3.0	5.0	14.5	23.5	52.0	42.0	95.0

In every case a point was reached beyond which the set went up abruptly. This point, we believe, represents the limit of the range. It seemed impractical to make a separate limit for each compound or class of compounds. In the majority of cases the break in the curve occurred between 60 per cent and 70

per cent. Accordingly 60 per cent of the breaking elongation was fixed as the most desirable point to which to stretch.

EFFECT OF SUCCESSIVE STRETCHING.

Ten pieces of stock were broken and the average elongation taken. Ten pieces of each stock were then stretched to 60 per cent of this elongation held ten minutes, released and measured after ten minutes. This was repeated to four stretches. The results shown in Table II are each the average of ten tests:

TABLE II. EFFECT OF REPEATED STRETCHING ON SET.

	Permanent Set after Each Stretch.					
Stretch	1st.	2nd. Additional Set.	3rd. Additional Set.	4th. Additional Set.	Total Set.	Set by First Stretch Figured to Percentage of Total Set.
Pure gum	4	2	0	0	6	66
Cheap friction	13	2	1	0	16	81
Friction	4	2	2	0	8	50
Low gravity tread	18	1	5	1	25	72
High gravity tread	14	6	4	1	25	56
Medium gravity tread	19	12	8	1	40	47.5
Cheap mechanical	22	9	8	1	40	50

Attempts have been made to reduce the time required for stretching and resting between stretches, but the results do not seem quite reliable, although for routine laboratory work we have used a shorter time. After using this method for two years, while we do not consider it perfect, we believe it far superior to any other method which has been proposed.—Earle L. Davies.

THE VALUE OF SHODDY IN MECHANICAL RUBBER GOODS.

A chart was presented which gave the cost relations between scrap rubber and reclaimed rubber. The reclaimed rubber was evaluated on a basis of tensile strength and compared to a corresponding priced new rubber. A line of demarcation through the center of the chart showed where it was more economical to use new rubber or reclaimed rubber.—J. M. Bierer.

RUBBER CHEMISTRY FROM THE COLLOIDAL VIEWPOINT.

The mechanism of crystallization, condensation, polymerization and coagulation was discussed. Gelation is one type of coagulation. Selective adsorption is given as a reason for the increased tensile strength of compounded rubber. This deals with the different surface energy of rubber and the various compounding ingredients.—Ellwood B. Spear.

JAR RINGS AND POISONED OLIVES.

NUMEROUS FATAL CASES of poisoning due to eating olives put up in glass jars have occasioned an inquiry by the United States Department of Justice as to the part alleged to have been played by rubber rings on jars. The president of one large packing concern in California, who started the investigation, claims a conspiracy by Germans during the war to poison this food product. He believes that the company from which he bought all its rubber vacuum jar seals for the olives put up in 1917 was victimized by sympathizers of Germany; and he is confident that analysis now being made by government chemists of the rubber used and the toxins said to have been produced in the olive solution, will confirm his claims.

His company, he said, lost $100,000 in spoiled goods, the first and only packs giving trouble being those of 1917 and 1918, and in which the suspected rubber was used. He believes that some enemy agents tampered with the rubber mixture in the making, not only by causing it to deteriorate in a short time, but that they also introduced into the rubber germs of a malignant disease. As soon as the rubber gave way, air entered the jars and the "bugs" produced toxins in the olives. Had the rubber been "glycerined" he believes the trouble might have been lessened or obviated. Careful checking, he says, showed that goods with perfect seals—the same olives being used—gave no trouble at all.

The Chicago concern which supplied the jar rings, received complaints from many other purchasers about similar goods, and the explanation given was that the company had trouble in getting pure rubber owing to the Government's demands for war needs.

As the federal government investigation findings may not be disclosed for a year, private agencies are trying to find out on their own account if it is likely the rubber seals could be poisoned in the manner suspected.

According to bacteriologists the olive-poisoning was caused by a bacterium known as botulinus, first isolated by German savants from spoiled sausage meat, although it is also found in canned animal products which have been known to cause ptomaine poisoning. It is described as obligate anaerobic, that is, it thrives best when deprived of oxygen or common air, and needs neither to develop a powerful toxin. It is possible, it is believed, to embed spores from such bacteria in suitably prepared rubber so that they might after a certain period and under favoring conditions harmfully affect foodstuffs in contact with such rubber. The fact that the spores are remarkably tenacious of life lends some color to the story that the poisoning was timed by enemy agencies through a rotting of rubber seals.

Certain it is, say the bacteriologists, that dry heat at 230 degrees C. will kill the botulinus, and it can also be destroyed by prolonged boiling at 212 degrees F.

On the other hand, the processes of rubber manufacture, specifically jar-ring making, are not perhaps understood by the scientists. They agree that sufficient heat will kill the germ. Granting that a germ-distributing German introduced the bacteria into a batch of ring stock on a mixing mill, the germs during the process of mixing would be subjected to a heat equal to that of boiling water for at least fifteen minutes. If the stock went at once to the tubing machine and was run off it would get another fifteen minutes of the same heat. Or if the rings were made by wrapping the stock in sheet form about a mandrel the heat of the warmer and the calender would be considerable.

The real exposure to heat, however, would be during vulcanization. Here the germ would have to stand certainly 300 degrees F., say for an hour and a half, depending of course, upon the grade of stock used.

In addition to this would be the presence of zinc and sulphur, which are certainly not germ food. It must be a fairly robust germ, extraordinarily tenacious of life that will survive entombment and vulcanization in a jar ring.

RUBBER FOOTWEAR ACTIVE.

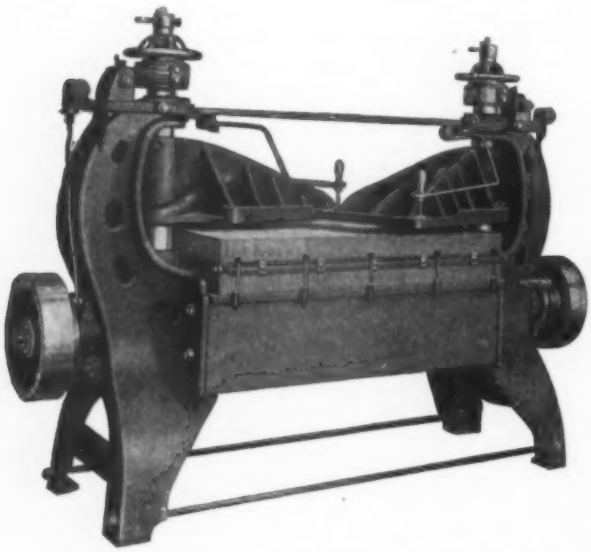
Present indications encourage the belief that the year 1920 will establish the record to date in the demand for rubber footwear of all kinds. An exceptionally snowy winter, which did not get its stride until after the new year came in, taxed manufacturers of arctics, overs and boots to capacity. With the passing of Easter and the coming of numerous signs of an early spring, other lines came to the front. Thus far, the demand for seasonable goods has been unusually large, and the variety of handsome styles of rubber and fabric shoes is great enough to attract many away from leather shoes for summer wear, especially in view of the continued high prices of leather shoes.

The less expensive athletic and outdoor shoes are rapidly increasing in popularity, affording economy, durability, comfort and attractiveness. Incidentally the high cost of leather footwear is increasing the demand for overs and footholds in order to protect the leather from water damage. Rubber boots are becoming regarded more and more as a necessary part of every man's outfit, and a comparatively new foot covering known as the rubber bootee is coming into popularity. It resembles the arctic overshoe, but has the quality of a rubber boot as far as it goes. Thus in many ways rubber footwear in its varied forms is rivaling leather footwear and for many purposes in certain seasons is a very practical "substitute."

New Machines and Appliances.

IMPROVED CLICKING MACHINES.

FABRIC CUTTING PRACTICE in the rubber factories of this country is showing a strong tendency toward the use of clicking machines in place of the old-style beam dinker. Two types are used—one for quantitative and qualitative cutting of all fabrics, and the other on work of a lighter nature.



MODEL B. CLICKING MACHINE FOR GENERAL WORK.

In the use of the clicking machine many advantages are claimed over the old-fashioned method: it eliminates the great liability of injury; it is less laborious to operate, and it is more economical in the use of materials, in that the percentage of scrap is reduced to the minimum.

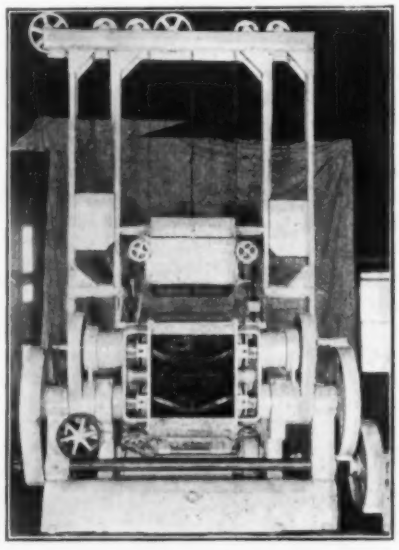
The cutting block of the ordinary dieing-out machine is a very inconvenient height and some of the dies are heavy and hard to move. In the clicking machine the working surface is at a restful height and in plain view; the die is light in weight and easily shifted and practically all danger of operating has been eliminated. With the fabric directly below his eyes on the cutting board the workman can place his dies on the clicking machine to cut more economically.

One of the greatest advantages claimed for the clicking machine is the accuracy of its work. On the beam dinker a heavy die is forced through many thicknesses of fabric, causing the material to spread, thus producing inaccurate cutting. (United Shoe Machinery Corporation, Albany Building, Boston, Massachusetts.)

MODEL C. CLICKING MACHINE FOR LIGHT WORK.

A NEW ENCLOSED MIXING MACHINE.

In the accompanying illustration is shown a mixing machine of the enclosed type, possessing structural features that are designed to produce a maximum product in a minimum of time.



THE EIMCO MIXER.

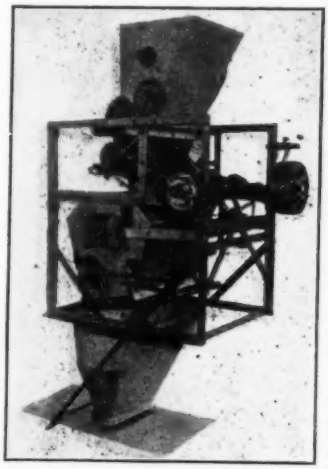
The frame of this machine is of substantial construction and sufficiently high so that the clearance of the mixing tank from the floor is at least 30 inches when tilted. The mixing tank is made of close-grained gray iron casting and jacketed and the inside is machined smooth. The heads are also made of close-grained gray iron casting, and are fitted with special stuffing boxes. The agitator is of special design, capable of mixing the rubber with the compound thoroughly. The agitator shafts are hollow and provided with heating or cooling fixtures.

The dust-proof feed-hopper is clamped tightly on the mixing trough when the machine is in operation. It contains separate compartments for the various materials, which are fed into the mixing trough by a compression feeding device that forces the required amount into the mixing trough. To increase efficiency, a dustproof compression cover can be raised sufficiently high to allow the dumping of the mixing tank for discharge. Means are provided for tilting the mixing tank either by hand or power.

This type of machine is only built in 75 gallons capacity, weight 3,400 pounds. (The East Iron Machine Co., Lima, Ohio.)

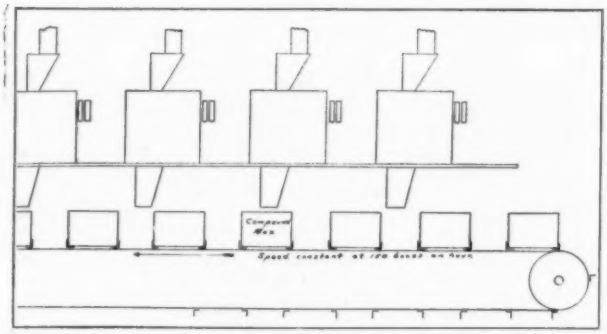
AUTOMATIC MACHINE FOR WEIGHING RUBBER INGREDIENTS.

In "Rubber Machinery," by Henry C. Pearson, the possibilities of an automatic machine for weighing compounding ingredients was suggested. "It is a swift, accurate and secretive weighing mechanism which works faster than any expert human weigher. The suggestion is that a gang of these machines could handle the ingredients that go to make up a compound, one machine to weigh whiting, another litharge, still another sulphur, and so on. Each machine takes its material from a bin, weighs it and delivers it into a common pan."



AUTOMATIC PIGMENT WEIGHER.

The realization of this prophecy is shown in the two illustrations herewith—one of the actual machine and the other, an installation plan of several machines. Each machine automatically weighs a different ingredient and discharges it into the compound boxes as they pass under each machine. (Automatic Weighing Machine Co., Newark, New Jersey.)



SECTION OF SIX-GANG COMPOUND WEIGHING INSTALLATION.

PEERLESS DUPLEX HACK-SAW BLADES.

This radical improvement in hack-saw blades consists in fine teeth at the toe and coarser teeth at the heel of the blades. The advantages of this design are obvious to every hack-saw user. At the beginning of the cut and on each succeeding stroke, the fine teeth at the toe of the blade cut easily and true at the slow starting speed, preparing the way for the faster cutting of the coarser teeth which come into play at high speed, as the rest of the blade enters the work.

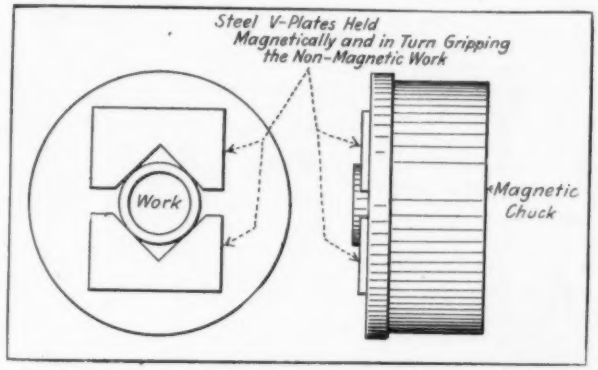
Peerless duplex blades are made in two types; all hard tungsten steel and flexible carbon steel. The former is especially adapted for use by tool makers in cutting tough steels, and by expert mechanics for general use.

The carbon steel flexible type is hardened on the tooth edge only. The remainder of the blade is only toughened to prevent excess stretch when tensioned. In plumbing, electrical and steam-fitting work, or in other trades where the material to be cut is of thin, irregular section, and where the work cannot be held rigidly in a vise or reached from an easy sawing position, it is the first choice of all good workmen. (Peerless Machine Co., Racine, Wisconsin.)

MAGNETIC CHUCKS.

Milling, planing, grinding and turning machines are now being equipped with magnetic chucks that have fully demonstrated their superiority over the old-fashioned jaw-chucks.

An interesting development is the use of magnetic chucks for grinding rubber gaskets and hard rubber electrical products. This is accomplished by two steel plates provided with "V" slots that grip the work through action of the magnetic chuck on the steel plate. This will be more readily understood by reference to accompanying illustration. This particular work is carried out on rotary surface grinders that are arranged with rotary magnetic chucks and are very accurate and fast for this class of work. (The Heald Machine Co., Worcester, Massachusetts.)



RUBBER GASKETS OR HARD RUBBER ARTICLES HELD IN MAGNETIC CHUCK OF SURFACE GRINDER.

PORTABLE ELEVATOR OR PILING MACHINE.

This portable elevator for elevating cases, bales, barrels, etc., for piling purposes, is a combined hand and motor operated machine. It is similar in construction to hand-operated and motor-operated portable elevators, but is equipped with a crank for hand operation, and with a small motor, the cord and plug of which may be conveniently attached to an ordinary lamp socket. The motor is small enough to be thrown directly on the line without the use of a starting box and is controlled by a simple knife-switch mounted on the elevator. The change from one form of operation to the other may be instantly effected.

UPPER VIEW HAND-OPERATED; LOWER VIEW MOTOR-OPERATED.

THE COMBINATION REVOLVATOR.

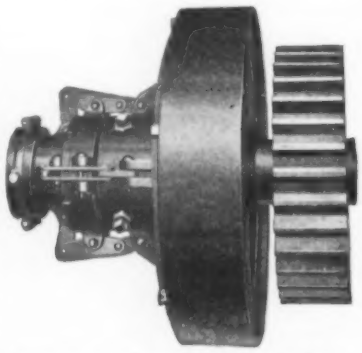
The advantage of this feature is apparent. The elevator may be operated by motor wherever current is available and by hand in those odd corners of the plant where current is unavailable. When operating by motor the manual labor of cranking is eliminated and a load as heavy as 1,800 pounds may be raised at approximately three times the speed attained by the average man operating by hand.

The machine may be furnished with any one of three different types of bases, revolvable, non-revolvable, or open and for use in connection with skids. The motor attachment may be fur-

nished for application to any hand-operated portable elevator. (Revolvator Co., Jersey City, New Jersey.)

A DISK TYPE FRICTION CLUTCH.

The simplicity of construction and the mechanical features embodied in the friction clutch here shown should recommend its use to rubber engineers.



THE PLAMONDON CLUTCH AND GEAR.

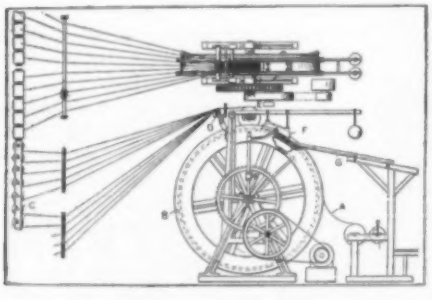
The continuous friction surfaces consist of three parts that are dust proof. The friction plate on the standard clutch is lined on both sides with continuous hard maple segments and can be removed for relining without disturbing the other parts. For special conditions the friction plate may be fitted with asbestos fiber, vulcanized fiber, or other friction surfaces. The pressure developed by the double toggles is such that the larger sizes of clutches are readily engaged and disengaged by means of ordinary hand levers, without the use of geared operating devices. The positive action of the double toggle movement in both directions, engages and disengages the clutch without the use of springs. The adjustment for wear is made entirely by one adjusting collar only, giving a uniform pressure on all parts of the friction surfaces. (A. Plamondon Manufacturing Co., 12-24 North Clinton street, Chicago, Illinois.)

MACHINERY PATENTS.

MACHINE FOR MAKING STORAGE BATTERY SEPARATORS.

A COMPOSITE BODY of rubber and fibrous material for making porous battery separators is formed on the machine here shown in side elevation and plan.

A strip of soft uncured gum *A* is fed on the steam heated drum *B*, and a large number of cotton threads from spools *C* are passed over guide *D* and around pressure roller *E*. Supplementing the internal heat of the drum, external heat is applied to the rubber strip by the curved iron *F* attached to the pressure-roller lever. As the drum revolves the threads are practically embedded in the soft rubber strip in a substantially side-by-side position extending across the periphery of the drum.



BATTERY SEPARATOR MACHINE.

When a strip of the desired thickness is formed, it is cut transversely and run off the drum by means of the chute *G* to a receiving table. A suitable number of these strips are superposed and compressed in a press vulcanizer where the composite body of rubber and fiber is semi-cured, after which it is cut into sections of the proper thickness. (Harry L. Boyer, assignor to Joseph Stokes Rubber Co., Trenton, New Jersey. United States patent No. 1,330,976.)

OTHER MACHINERY PATENTS.

THE UNITED STATES.

NO. 1,333,882. Apparatus for trimming heel-pads, rubber soles and tips for boots, etc. J. Sumner, Leyland, assignor to Wood-Milne, Limited, Manchester—both in England.
1,333,927. Tire-making machine. E. C. McGraw, assignor to The McGraw Tire & Rubber Co.—both of East Palestine, O.
1,334,185. Machine for making tire casings. W. C. Stevens, assignor to Firestone Tire & Rubber Co.—both of Akron, O.
1,334,629. Mold for tires. M. L. Munger, Lincoln, Neb.
1,335,101. Air bag with removable outer surface layer, for vulcanizing pneumatic tires. F. Fenton, assignor to The Miller Rubber Co.—both of Akron, O.
1,335,124. Apparatus and method for removing entrapped air from uncured rubber articles. T. Midgley, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls—both in Massachusetts.
1,335,150. Mold and process for making tires. P. I. Anderson, Des Moines, Ia.
1,335,353. Air bag for vulcanizers. J. H. Smith, San Francisco, Calif.
1,335,783. Repair vulcanizers. A. A. Dorsey, Lawrence, Kans.
1,335,879. Apparatus and method for building pneumatic tires. B. Darrow, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,336,220. Repair vulcanizer. W. A. Gwynn, assignor to S. E. Gwynn—both of St. Louis, Mo.
1,336,319. Machine for placing washers in rubber-heel molds. B. W. Martin, Zanesville, and H. Sams, Akron—both in Ohio.
1,336,328. Apparatus for wrapping and unwrapping tires. C. Ziegler, Barberton, O.
1,336,329. Apparatus for wrapping and unwrapping tires. C. Ziegler, Barberton, O.

THE DOMINION OF CANADA.

197,732. Tire-opening machine. W. C. Stevens, Akron, O., U. S. A.
197,785. Vulcanizing machine. The City Trust Co., assignee of J. Porzel—both of Buffalo, N. Y., U. S. A.
198,140. Apparatus for applying cushion tires to rims. W. C. Stevens and C. W. Steele, coinventors—both of Akron, O., U. S. A.
198,158. Machine for pressing rubber. C. H. Allred, Medicine Hat, Alta.
198,477. Repair vulcanizer. M. L. Munger, Lincoln, Neb., U. S. A.
198,558. Apparatus for separating tires from cores. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of J. J. Shea, Hartford, Conn., U. S. A.
198,565. Tire cutting or trimming machine. The Goodyear Tire & Rubber Co., assignee of E. A. Nall—both of Akron, O., U. S. A.
198,610. Apparatus for supporting tire casing and spreading beads. E. Ramsdell, assignee of F. M. Case—both of Cleveland, O., U. S. A.
198,816. Vulcanizing apparatus. Firestone Tire & Rubber Co., Akron, assignee of O. F. Beck, Lawndale, and J. W. Speers and R. R. Jones, both of Akron—all in Ohio, U. S. A.
198,822. Segmental tire-core. The Goodyear Tire & Rubber Co., assignee of C. Wattleworth—both of Akron, O., U. S. A.
198,823. Interlocking tire-mold. The Goodyear Tire & Rubber Co., assignee of C. Wattleworth—both of Akron, O., U. S. A.

THE UNITED KINGDOM.

137,569. Drive for rubber mill. F. Iddon, School Lane, Leyland, Lancashire.
137,820. Rubber mixer. Farrell Foundry & Machine Co., 30 Main street, assignee of D. R. Bowen, 5 Clover street, and C. F. Schnuck—all of Ansonia, Conn., U. S. A.

AUSTRALIA.

To Americans.

11,963. Machine to shape fabric for cord tires. J. D. Thomson, Ohio, U. S. A.
11,330. Press for hollow rubber articles. W. Spruson, for F. T. Roberts and R. H. Rosenfeld, Cleveland, O., U. S. A.

GERMANY.

321,106. Mold for solid rubber tires, casings, and the like. Leonhard Herbert, Frankfort am Main. (Date of application, October 13, 1918.)

PROCESS PATENTS.

THE DOMINION OF CANADA.

NO. 197,734. Manufacture of cushion tires. F. W. Strong, Dallas, Tex., U. S. A.
197,784. Vulcanizing rubberized fabric or sheet rubber. The City Trust Co., assignee of Joseph Porzel—both of Buffalo, N. Y., U. S. A.
198,686. Manufacture of solid tires, with means to permit escape of entrapped air during vulcanization. D. E. Goodenberger, Akron, O., U. S. A.
198,772. Manufacture of tires from cord fabric. J. C. Tuttle, Akron, O., U. S. A.
198,821. Preparation of tire tread and side wall stock. The Goodyear Tire & Rubber Co., assignee of B. Darrow—both of Akron, O., U. S. A.

THE UNITED KINGDOM.

137,948. Finishing fabric by beetling roll of alternate layers of rubber or rubberized fabric and the fabric to be finished, etc. J. H. Wrigley, 4 Darley Road, Whalley Range, Manchester, and A. B. Henshilwood, 1430 Leeds Road, Thornbury, Bradford, Yorkshire.

AUSTRALIA.

To Americans.

10,077. Molding rubber balls. W. J. Spruson, for F. T. Roberts and R. H. Rosenfeld, Cleveland, O., U. S. A.
11,667. Retreading pneumatic tires. S. H. Goldberg, Chicago, Ill., U. S. A.

New Goods and Specialties.

A BRITISH RUBBER HAT.

THE SPRING trade in Britain is reported to be brisk in weather-proof and rainy-day hats, some of which are of oiled silk combined with velvet, others of oiled silk entirely. The woman's hat shown here, however, is of most interest to the rubber trade because it is made of rubber. It has a full, one-piece crown and a plain brim, wired, while the trimming consists of a band and bow of rubber of a contrasting color. The edge is of the same color as the trimming and the hat is lined but not reversible as are some of the models of oiled silk or mackintosh material. These hats are said to be in good demand in overseas markets as well as in Britain. (Edward Macbean & Co., Limited, Glasgow, Scotland.)

("*The India-Rubber Journal.*")
THE RUBBER HAT ABROAD.

BATHING CAPS OF THE SEASON.

Three attractive bathing caps pictured below represent some of the newer models which are being displayed at the present time. They are made of high-grade rubber in different colors trimmed with ornaments of contrasting shade. The "Victory" at the left is polka-dotted in white and has a full shirred body with enclosed sponge rubber head-band, this latter feature being patented, while an ornament finishes the top. The center cap, "Service," is patterned after a service cap. The seams are bound with rubber of contrasting color and the front is decorated with stars. The cap at the right is a large diving cap, having a round crown to which the body of the cap is neatly and securely bound. A buckle ornament in contrasting colors constitutes the trimming on one side, and the head-band is in two colors. (The Faultless Rubber Co., Ashland, Ohio.)

"VICTORY" CAP. "SERVICE" CAP. DIVING CAP.

A BRUSH FOR THE HANDS AND NAILS.

Brush manufacturers, seeking to meet the popular demand for brushes having the bristles set in rubber, are putting something novel on the market every now and then. The brush at the left is for cleaning the nails and is made of the best black bristle securely vulcanized in a rubber block. It can be sterilized in boiling water without danger of the back coming off or splitting, a feature which appeals to those who insist on having personal belongings thoroughly sanitary.

"O. D. S." NAIL-BRUSH.

POCKET HAIR-BRUSH AND MIRROR.

Women will appreciate the novelty illustrated here—a sanitary hair-brush which, with its mirror-lined cover, forms a pocket case of great convenience. The brush itself is of high-grade black bristle set in a rubber cushion which can be removed for the purpose of sterilizing. This is accomplished by light pressure of the finger and is replaced as easily. The cover contains a mirror. The aluminum case is light in weight and non-corrosive. Both the nail-brush and the hair-brush are made by the same concern. (O. Dennin's Sons, Inc., Troy, New York.)

"O. D S." POCKET HAIR-BRUSH AND MIRROR.

THE "ERIE CORD" TIRE.

One of the latest additions to the growing list of cord tires is the "Erie Cord." The design of this tire is both rugged and attractive with a remarkably bulky anti-skid tread of the highest quality of rubber composition. "Erie Cords" have been satisfactorily demonstrated in service tests and are being guaranteed for 12,000 miles. (The Erie Tire & Rubber Co., Sandusky, Ohio.)

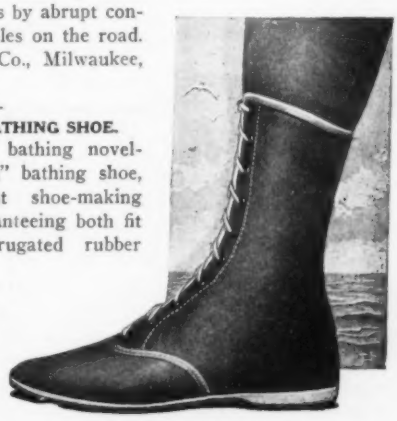
"ERIE CORD" TIRE.

LUDINGTON ARMORED PNEUMATIC TIRE.

The Ludington armored pneumatic tire casing contains a layer of thin, flexible, resilient brass plates reinforcing the carcass from bead to bead, interposed as a layer dividing the fabric plies into two groups. The plates are laid snugly, edge to edge, at the tread but separate as they approach the bead. Above and below the layer of plates are thick plies of cushion rubber which unite along the side walls and prevent separation of the inner and outer layers of fabric plies, while the metallic layer serves to prevent both punctures and blow-outs. Each plate is corrugated midway between tread and bead to allow transverse movement for equalization of the air pressure and to obviate possible breakage of the plates by abrupt contact with hard obstacles on the road. (Ludington Rubber Co., Milwaukee, Wisconsin.)

RUBBER-SOLED BATHING SHOE.

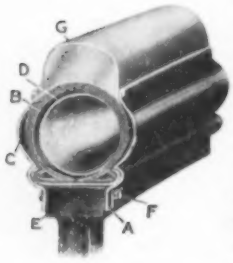
Among the latest bathing novelties is the "Bruxshu" bathing shoe, embodying the best shoe-making principles, thus guaranteeing both fit and style. A corrugated rubber sole is fastened to the usual upper of fabric by a special patent process, and in some models there is a leather counter to support the back and low rubber heels to add to the wearer's comfort in walking on the beach. These shoes, it is claimed, will wear an entire season. (Brooks Shoe Mfg. Co., 1735 North Sixth street, Philadelphia.



THE "BRUXSHU" BATHING SHOE.

A NEW THREE-IN-ONE TIRE.

The "Luck Botherless" tire claims to provide against rim cuts, blow-outs, punctures, sand blisters, etc., by its ingenious construction. The inner tube D is enclosed inside the fabric skirt B, which bears the rubber tread cushion G and is, in turn, inclosed within protective flanges of steel, fastened with eight bolts to the felloe E of the wheel. These flanges extend from near the bottom of the felloe to above the juncture of the solid rubber tread with the fabric skirt. An air space C is provided between the flanges A and the fabric skirt B of the tire, to prevent mud or grit from clogging. It also has a tendency to keep the tire cool. The beads have an extra heavy canvas covering and are protected by the steel flanges. (Luck Tire & Manufacturing Co., 325 Bedell Building, San Antonia, Texas.)



"LUCK BOTHERLESS" TIRE.

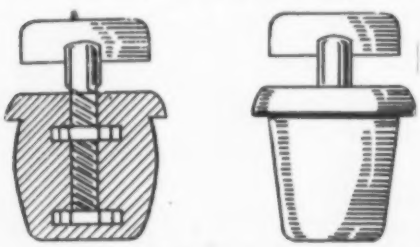
GAS OR SMOKE MASK.

A mask of improved construction, intended to protect workmen from gas, smoke, or dust is made of aluminum and rubber, as illustrated. It has an inflated face rim and is fitted with specially constructed spiral tubing so flexible that the natural air supply cannot be cut off by twisting or knotting. The tubing is carried by a belt and the head-piece fastens with adjustable elastic straps. (Improved Aluminum Gasco Protector Co., Chicago, Illinois.)

"GASCO" PROTECTOR.

EXPANDING AND CONTRACTING STOPPER.

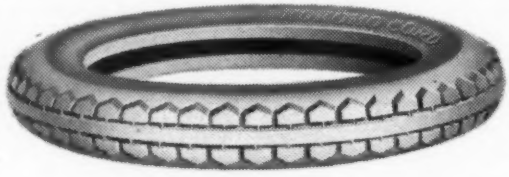
No more unpleasant experiences with corks that do not fit the containers for which they are needed or that break in extraction. The one here pictured is a welcome novelty, indeed. It is made of pure red rubber, molded around a nickel screw, traveling between two brass washers, firmly embedded and keyed in the rubber. This screw is swiveled in the lower washer to turn without engaging the thread. As the screw is turned to the right, the upper washer is brought closer to the lower one, thus expanding the rubber in between so as to enlarge its diameter, as illustrated in the cross-sectional view. The reverse movement forces the washers apart, elongates the rubber, and provides positive contraction, permitting the stopper to be easily withdrawn from the bottle or container. (The Sampson Appliance Corporation, 13 East 16th street, New York.)



"SAMPSON" ADJUSTABLE STOPPER.

A SILVER ANNIVERSARY CORD TIRE.

The new cord tire herewith illustrated, produced to celebrate the silver anniversary of pneumatic tire production, has a distinctive twin grip tread, with a center rib to support the weight of the automobile, while on either side there is a row of pavement-gripping wedges intended to stop any tendency to skid laterally. The color combination produced by the white tread and gray side walls is one which harmonizes with the finish of any car. (The Kokomo Rubber Co., Kokomo, Indiana.)

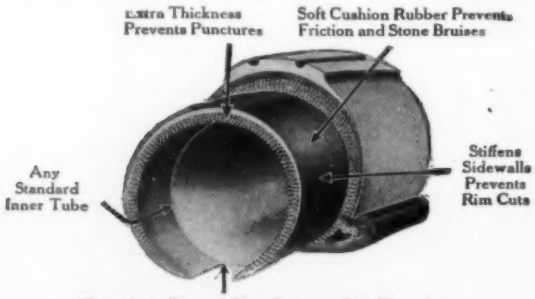


"KOKOMO CORD" TIRE.

NOVEL SUB-TIRE.

A novel sub-tire that slips within any tire casing is made in all standard sizes and is said not only to protect the casing, but to double its life and prevent blow-outs.

Many automobile users seem to prefer the sub-tire to the uncertainties of retreading. An additional safeguard against injury to inner tubes is said to be provided by the sub-tire, and the general wheel resiliency much enhanced. Although the product is but a new one, the sales now reach $100,000 a year and the rapid growth of the business has necessitated the recent removal of the plant to larger quarters. (Planet Rubber Co., 223 East 9th street, Los Angeles, California.)



PLANET SUB-TIRE.

RUBBER SUIT AND SAFETY GOGGLES.

The diverse operations carried on in the modern industrial factory make an insistent demand for adequate protection for the workman. The rubber suit shown here is acid, fire and waterproof, provided with snap buttons on front and at wrists and ankles.

The rubber-rimmed goggles are air and gas tight, held by elastic straps. (The Safety Equipment Service Co., 2044 East Ninth street, Cleveland, Ohio.)

RUBBER-RIMMED GOGGLES.

"PROTEXAL" SUIT.

THE SALVAGING OF TRUCK TIRES BY THE ARMY.

TO EFFICIENCY EXPERTS in the United States Army service, few things had been more distressing than the practice among soldiers of removing solid motor truck tires by direct application of heat. For a long while officers charged with the correction of wasteful methods vainly experimented in the hope of finding a better method. The difficulty lay, of course, in the adhesion of the hard rubber layer to the metallic wheel-bands. The soldiers removed the tires from the wheels easily enough but much rubber was ruined by heat and lessened in value as scrap, and generally the hard rubber base remained with the rubber.

The heat process was a makeshift at best, for often spoilage quite equalled salvage. Usually a dozen tires were piled on top of one another, being raised from the ground by bricks or stones, and the cracks between the rims were plastered with mud. A wood fire was built in the stack thus created, and in about five minutes the tires would fall off, provided they had been notched all the way through at one point before heating. The mud was used to keep the flames from coming through the cracks and burning the rubber, but too often it failed in its purpose.

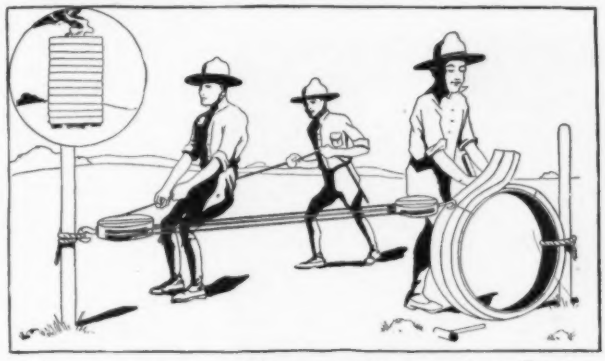
Finally an improvement on the heat method was evolved at Camp Logan, Texas, and the process proved so satisfactory that a general order was issued by the United States Army Director of Purchase and Storage in Washington to all depot, camp and post supply officers to discard all other methods of removing rubber from steel bands and employ that devised at Camp Logan. The instructions were as follows: provide two posts or trees about 10 feet apart; a double and a single ⅝-inch block; 30 feet of ½-inch rope; two heavy steel knives 14 by 2 inches; two carpenters' 2½-inch wood chisels; a pricker to remove stones from rubber; one steel ring or a half dozen 6-inch rings of hay wire, doubled.

The tire is placed against the post, resting on the ground in an upright position and the rope wrapped once around the tire, then around the post and tied so that the tire may be shifted easily. On the other post the rope is wrapped twice and tied permanently about three feet from the ground. The double block is hooked on the post with a permanent tie and the single block played out to the tire.

With the knife cut across the top of the tire at a 45-degree angle, down to the iron rim and nick each side of the tire at the base of the cut. Slip one of the hay wire rings into the cut and pull tight to catch in the nicks at the sides of the rubber, hooking the single block in the wire ring.

One operative, handling the tackle, tightens up on the tire carefully to start the rubber; a second operative helps to handle the tackle and steady the tire, and a third, using the wood chisel, cuts in at the edges where the rubber hangs.

As the blocks are steadily pulled, the rubber peels down to the cement, leaving the fabric and cement on the iron band.

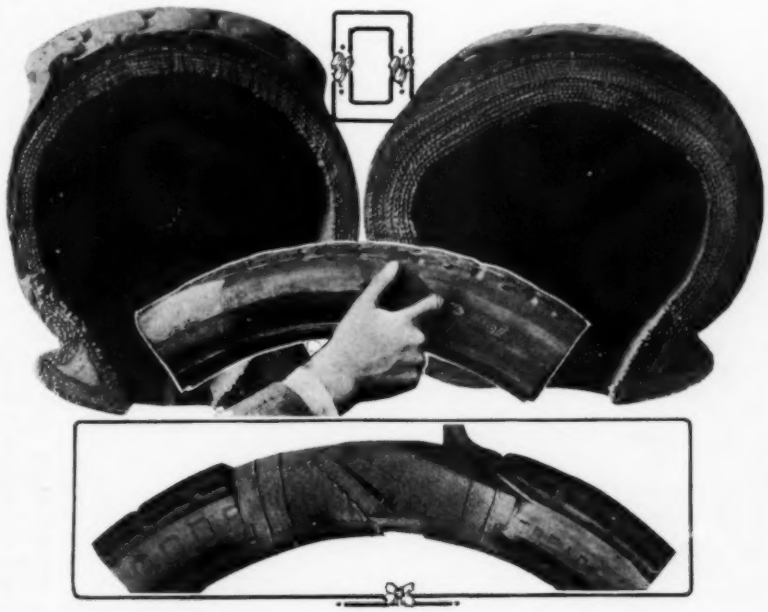


UNITED STATES ARMY METHOD OF STRIPPING SOLID TRUCK TIRES. HEAT PROCESS SHOWN IN INSERT.

When the tire is peeled to the ground, it is shifted upward, the rubber again nicked at each side, the hay wire ring loosened from the peeled section and placed in newly cut nicks. The blocks are again attached and the peeling finished.

THE RIGHT AND WRONG OF A BLOW-OUT REPAIR.

The most frequent mistake made by repair men in repairing a blow-out is failure to remove the worn fabric from the injured portion of the tire, the tendency being to add rather than replace layers of fabric. Here are shown three views of a four-inch, five-ply fabric tire which was repaired by adding eight plies of new fabric to the five plies of worn fabric in the tire. After running a few hundred miles the tire blew out again. It was found on examination that eight plies of extra fabric extended to the point of the blow-out. In running, a "hinge" had formed at the merging point of the five- and the thirteen-ply sections that worked backward and forward, thus weakening the structure and causing the blow-out.



(The B. F. Goodrich Co.)

UNSUCCESSFUL TIRE REPAIR PICTURED. UPPER LEFT—CROSS SECTION FIVE-PLY TIRE BEFORE REPAIRING. UPPER RIGHT—AFTER REPAIRING, THIRTEEN PLIES INSTEAD OF FIVE. CENTER PICTURE—BLOW-OUT OCCURRED AT MERGING POINT OF FIVE AND THIRTEEN PLIES. LOWER—CORRECT METHOD OF FABRIC PREPARATION.

The lower picture shows a tire stripped back in the approved method of repairing a blow-out. All the fabric, except just enough for a foundation, has been removed in steps to avoid sharp breaks between the old and the new fabric. The repair man then begins the process of building up, carefully following the standard of practice and using only the best materials available.

THE OBITUARY RECORD.

A GREAT MAN IN THE TELEPHONE INDUSTRY.

THEODORE NEWTON VAIL, chairman of the board of directors of the American Telephone & Telegraph Co., of which he had been president until last June, and also a director of the United States Rubber Co., died April 16, 1920, at the Johns Hopkins Hospital in Baltimore, of a complication of heart and kidney diseases, after a surgical operation had proved ineffectual. He had been brought to the hospital from Jekyll Island, off the Georgia coast, where he had passed the winter. He was in his seventy-fifth year, having been born June 16, 1845, in Carroll County, Ohio.

THEODORE N. VAIL.

Mr. Vail's name is written as indelibly in the history of the telephone as is that of Alexander Graham Bell, for his executive ability and faith in the invention were as essential to its successful practical establishment as were Bell's experiments.

Vail rose from the ranks. His family had moved to Morristown, New Jersey, when he was an infant, and there he went to school and attended the Morristown Academy, intending to be a doctor. He learned telegraphy and when he was twenty-one went West with his parents; there he worked for the Union Pacific railroad and attracted the attention of General Grenville M. Dodge, who had him appointed a clerk in the railway mail service. He organized the service so well that by 1876 he had been called to Washington as assistant, and soon after as chief superintendent.

He left the government service in 1878 to become general manager of the new Bell Telephone Co. The hard fight he made to put the company on its feet is one of the epics of American industry. Very soon he saw the possibilities of the long-distance service and fought hard to secure the capital for the lines from Boston to Lowell and to Providence, that demonstrated the feasibility of the idea. In 1885 he became president of the American Telephone & Telegraph Co. that was to develop that side of the business. By 1887 he was obliged to give up and attend to his health, when he retired to his farm at Lyndonville, Vermont.

In 1893 he visited South America and his spirit of enterprise was again aroused. At Buenos Aires he bought a horse-car line, applied electricity, established a telephone system, and devoted ten years to developing Argentina. In 1904 he retired again, returning to his Vermont farm. Then he lost his wife and his only son, and in 1907 was ready to accept the call to return to the presidency of the American Telephone & Telegraph Co. and try to straighten out its affairs. In three years he was enabled to buy out the company's old competitor, the Western Union, and in 1910 became president of that company also. In 1914 the two were to have been amalgamated, but the Government stepped in to forbid it. With the outbreak of the war and the Government taking control of both systems, Mr. Vail was put in charge, remaining at the head of both till they were returned to their owners. This was only one of his many activities during the war. In June, 1919, he finally gave up the presidency of the American Telephone & Telegraph Co.

The large use of rubber in the telephone business, as insulating material for instruments and their parts, and for other purposes, naturally interested Mr. Vail in rubber. He shared in the development of the United States Rubber Co., and for some years has been a director.

Harvard, Princeton, Dartmouth and Middlebury conferred on Mr. Vail their honorary degree of Doctor of Laws, the University of Vermont made him a Doctor of Science and New York University a Doctor of Commercial Science. In 1912, Mr. Vail presented to the Massachusetts Institute of Technology the library of George Edward Deering, said to be the most nearly complete collection of books on electricity in the world; for this he is believed to have paid $100,000. He also founded the Lyndon Agricultural School at Lyndon, Vermont.

Mr. Vail, besides being a director in many business concerns, was a trustee of the Boston Museum of Fine Arts and a director of the Boston Opera House, a member of the Metropolitan Museum of Arts, American Geographical Society, American Natural History Society, American Academy of Political and Social Science; of the New York, Union League, New York Athletic, Automobile of America, Metropolitan, Hobby, Jekyl Island, National Arts, Railroad, Sleepy Hollow, Westchester Country, Larchmont Yacht, Union and other clubs; and of the Sphynx and Royal Automobile Clubs of London.

In 1907, Mr. Vail married the second time and is survived by his widow.

PROFESSOR KARL DIETERICH, PH.D., DIRECTOR OF THE HELFENBERG chemical factory, died in Dresden at the end of March, age 51 years. He was interested in the employment of rubber and cognate materials in pavements, and published investigations in rubber and resins.

STATEMENT OF INDIA RUBBER WORLD.

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of THE INDIA RUBBER WORLD, published monthly at New York, New York, for April 1, 1920.

State of New York, } ss.:
County of New York. }

Before me, a notary public in and for the State and county aforesaid, personally appeared E. M. Hoag, who, having been duly sworn according to law, deposes and says that she is the business manager of THE INDIA RUBBER WORLD, and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, The India Rubber Publishing Co., 25 West Forty-fifth street, New York City.

Editor, Henry C. Pearson, 83 Agawam Road, Waban, Massachusetts.

Managing editor, none.

Business manager, E. M. Hoag, 25 West Forty-fifth street, New York City.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

Henry C. Pearson, 83 Agawam Road, Waban, Massachusetts.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by her.

E. M. HOAG, Business Manager.

Sworn to and subscribed before me this 31st day of March, 1920.

[SEAL] THOMAS P. BURKE, Notary Public.

My commission expires March 30, 1921.

INTERESTING LETTERS FROM OUR READERS.

RUBBER AND METALLIC SUBSTANCES APPLIED TO CLOTH.

TO THE EDITOR:

DEAR SIR: I am writing to ask if you know anything of the process used in decorating cloth like the enclosed sample. I know it was an ancient art in India. The question is how to reproduce it with modern methods.

If you can refer me to any writing on the process of applying rubber to cloth which may be used with metallic substances, I shall be very grateful.

This is a technical subject about which I know very little and I was unable to get satisfaction from books.

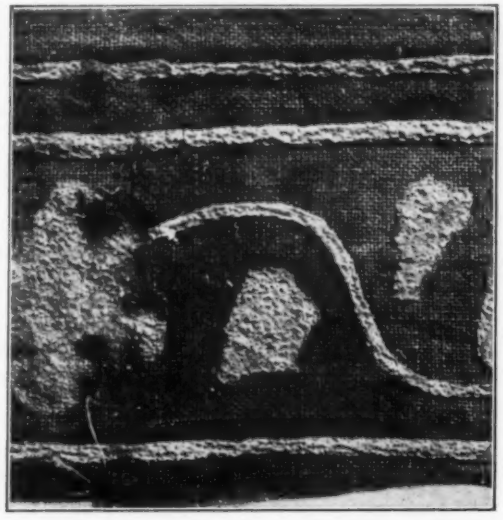
I shall be very grateful to you for an early reply.

GRACE G. DENNY,
In charge of textile laboratory.

University of Washington, Seattle, Washington.

REPLY BY THE EDITOR.

The sample of cloth ornamented with gold flowers which you sent me is of exceeding interest. It may be a rubber product,



PERSIAN FABRIC ORNAMENTED WITH "GOLD AND RUBBER"

at least in part. The milk of a rubber tree, the *Ficus elastica*, was used in India more than a thousand years ago. It is probable that the rubber from it was also used. A native could easily make a thick rubber paste and apply it to fabric in crude lines of ornamentation; then, while still adhesive, dust it thickly with metallic powder. That used on the sample looks like pyrites. If it is, exposure of the decorated surface to the sun would result in the type of vulcanization known as solarization, or sun-cure, the three concomitants, rubber, sulphur (or a sulphide) and heat, being present. I do not, of course, assert that this is the fact, but it is not impossible.

I recall something of this sort of native work in Kuala Lumpur, F.M.S., where a coolie decorated his Chinese shoes with stripes in blue and crimson. The body of the stripe was freshly coagulated rubber exposed to heat to render the surface sticky. This was then dusted, one stripe with a blue powder, the other with a crimson. The whole was then thoroughly dried out in strong sunlight.

With regard to work of this type, in our own day Charles Goodyear did some very fine ornamental work on fabric and leather, using a thick rubber cement which was dusted over with "flock" of various colors. None of this work is in existence to-day, as far as I know.

Twenty-five to thirty years ago, when the rubber surfaced "gossamer" was popular, the unvulcanized surface was ornamented by applying starches, and in a few instances, metallic powders, after which the garment was cured.

To imitate the sample to-day, a thick paste of rubber applied from a collapsible tube in the form of decoration, this to be dusted while sticky with bronze powder, brass filings, or any mineral powder desired. If the rubber paste is to be sun-cured, it should contain sulphur. Or it could be cured in dry heat, or, containing no sulphur, be exposed to the fumes of chloride of sulphur. There is no doubt that very beautiful and permanent decorative effects could be obtained by the process outlined.

THE EDITOR.

SPECIAL LIBRARY CENSUS.

TO THE EDITOR:

DEAR SIR: At a time when the Government is counting up its inhabitants, the Special Libraries Association is enumerating the special library collections of the country, because there does not exist at present an adequate directory of special libraries.

In the spirit of cooperation, and in order to list the special information sources of the country, the Special Libraries Association—the national body of special librarians—submits the following questions and respectfully asks you to take the trouble to answer them. When compiled, the directory will not be used as a mailing list for advertisers, but merely for the purpose stated, namely, to have in a central place, a record of the special information sources of the country.

A special library has been defined as:

> A good working collection of information either upon a specific subject or field of activity; it may consist of general or even limited material serving the interests of a special clientele; and preferably in charge of a specialist trained in the use and application of the particular material.

If your library comes within the above qualifications, the Special Libraries Association will appreciate the following information from you:

(1) Name of institution or company.
(2) Name by which library is known.
(3) Name of librarian or custodian.
(4) Can it be classified as any of the following: Financial; business; legal; engineering or technical; institutional; municipal; reference; agricultural.
(5) If not, how can it be classified?
(6) Does it serve a special clientele?
(7) Would your librarian be willing to assist other special libraries to a reasonable extent?

The above data should be sent to William F. Jacob, Chairman Library Census Committee, care of General Electric Company, Schenectady, New York, who will be glad to answer any questions relating thereto.

ON EXPANSION OF RUBBER COMPOUNDS DURING VULCANIZATION.

TO THE EDITOR:

DEAR SIR: I have read with great interest the paper on the "Expansion of Rubber Compounds during Vulcanization," communicated by C. W. Sanderson to the Rubber Division of the American Chemical Society and reprinted in your journal, February 1, 1920. Mr. Sanderson states that one of the first questions which arose in connection with the expansion of rubber was whether or not there was a break in the curve, or, in other words, a volume change *at the point of vulcanization*. The author does not, however, explain what he means by the point of vulcanization, and, as matter of fact, vulcanization has now been shown to take place perfectly gradually although it increases more rapidly than the rise in temperature. He also states that "we know that a physical change takes place, and that the specific gravity increases." The specific gravity is,

however, presumably determined on the raw and vulcanized rubbers at room temperatures, whereas Mr. Sanderson's measurements of expansion have been taken at the temperature of vulcanization. The difficulty as regards the increased specific gravity of vulcanized rubber can probably be explained by assuming that vulcanized rubber possesses a greater cœfficient of temperature expansion than raw rubber so that although a given weight of vulcanized rubber may occupy a larger volume than that of raw rubber at the vulcanizing temperature, it may occupy a smaller volume at room temperature.

I therefore suggest that, to make the matter clear, Mr. Sanderson should amplify Conclusion 5, by stating definitely what he means by the point of vulcanization; and Conclusion 6 also may require modification unless it can be shown that the specific gravity of vulcanized rubber is greater than that of raw rubber at the temperature at which vulcanization is taking place.

HENRY P. STEVENS.

15 Boro', London Bridge, S. E. 1.

SANDERSON'S REPLY.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—Dr. Stevens' points are well taken, but I believe his objections will be met if I make my meaning clearer.

(1.) The phrase, "point of vulcanization" was perhaps an unfortunate expression to have used. I think everyone will agree that vulcanization does take place gradually and my experiments bear this out by showing that there were no breaks in the cures. By "point of vulcanization" I simply meant to describe that region of vulcanization to which rubber is cured in ordinary practice.

(2.) In discussing the changes in specific gravity I simply attempted to prove that the increase was due to the external pressure which is applied during the cure. I did this by comparing the results obtained under different degrees of external pressure. Samples cured with low external pressure showed almost no increase in specific gravity, while those cured with high external pressure showed considerable increase in specific gravity.

C. W. SANDERSON.

THE EDITOR'S BOOK TABLE.

"A TABLE OF TENSILE STRENGTHS OF RUBBER. BY HENRY W. Jacobsen and Joseph E. Partenheimer, 1919. Printed for the Fisk Rubber Co., Chicopee Falls, Massachusetts.

THIS publication consists of a series of tables arranged for ascertaining the tensile strength of rubber test pieces. The information sought is tabulated under the dimensions of the cross-section of the test piece arranged at the top of the table, with observed pounds' pull registered at the breaking point recorded at the side. This compilation will be found very convenient in eliminating calculations in testing laboratories where the routine calls for many tensile tests and quick information as to the results.

"THE METRIC FALLACY." BY FREDERICK A. HALSEY. THE American Institute of Weights and Measures, New York, 1919. (Cloth, octavo, 9¼ by 6 inches, 229 + 10 pages.)

Mr. Halsey's plea against the general adoption of the metric system appears, after fifteen years, in a second, revised edition, brought up to date, several chapters by Samuel S. Dale having been added.

"INORGANIC CHEMICAL SYNONYMS AND OTHER USEFUL Chemical Data." By Elton R. Darling, New York. D. Van Nostrand, 1919. (Cloth, 4½ by 7 inches, 100 pages.)

This book is the outcome of a series of articles dealing with the subject which appeared in "The Chemical Engineer" in 1918. It is prepared for the use of students, but will be found a convenience by the experienced chemist. About one-third of the book is taken up by various useful tables of data concerning the elements, specific gravity, temperature comparison, and standards of weights and measures. The remaining pages are devoted to lists of chemical synonyms in chapters arranged alphabetically by elements, each list being preceded by a brief account of the element, including its discovery and leading characteristics.

The book concludes with a cross-index of chemical names as an aid in finding true chemical names and other synonyms associated with them.

"INDUSTRIAL CHEMISTRY." A MANUAL FOR THE STUDENT and Manufacturer. Edited by Allen Rogers. Third Edition, 1920. D. Van Nostrand, New York. (Cloth, 6 by 9 inches, 1232 pages.)

The third revised edition of this standard work on industrial chemistry appears after an interval of five years since the publication of the second edition. It has been enlarged by over two hundred pages and seventy new cuts.

The chapter on rubber has been enlarged by the inclusion of new matter in nearly every section, although an exhaustive treatment of the subject is not attempted. The chapter closes with two pages of bibliography which includes references to certain important legal decisions in causes relating to rubber-working processes and products. The references to the literature of rubber are extremely few. No mention is made, under periodical literature, of the leading rubber journals of America, England, France, or Germany, all of which are important in the industrial field.

NEW TRADE PUBLICATIONS.

GUTTA PERCHA & RUBBER, LIMITED, TORONTO, CANADA, ISSUED its price list of "Maltese Cross" rubber footwear on March 1 for the season of 1920-21. Coincident therewith appeared an attractive 64-page illustrated catalog numbered S-24, showing the company's latest styles in boots, lumbermen's arctics, excluders, overs, slippers and footholds. It comprises a varied and interesting line of attractive appearance and well-known quality.

"THE THERMOID NEWS" IS THE TITLE OF A VERY NEAT SEMI-monthly factory paper published by the Thermoid Rubber Co., Trenton, New Jersey, for the benefit of its employes. It is full of helpful hints, practical talks on trade topics, and entertaining chats about the staff and operatives in the big Trenton plant. Chester A. Charles is editor, assisted by Fred Birkholtz, Harry W. Searfoss, E. W. Craft, Richard A. Kirk and P. Krier.

THE HABIRSHAW ELECTRIC CABLE CO., NEW YORK CITY, HAS ISsued a 16-page illustrated pamphlet entitled "1650," outlining succinctly and entertainingly the development of insulated wires and cables from Guericke's first experiment in 1650 to the present day. Incidentally some very interesting facts about the great Habirshaw industry are presented, together with several views about the firm's plant at Yonkers, New York.

THE CHICAGO CHEMICAL BULLETIN, PUBLISHED MONTHLY BY the Chicago Section of the American Chemical Society, has issued a pamphlet of 11 pages entitled "Chemists' First-Aid Treatment", by Paul Nicholas Leech. The emergency treatment of burns, abrasions, and bruises, and of internal conditions are treated briefly but adequately. There are also addenda from the "Handbook of Therapy" on poisons.

THE MOTOR & ACCESSORY MANUFACTURERS' ASSOCIATION ISSUES under the title, "The Triumph of Team-Work," a handsome pamphlet containing letters from many firms, praising the work of the association.

L. E. KNOTT APPARATUS CO., BOSTON, MASSACHUSETTS, IN their Catalog 24C present a valuable descriptive list of chemical and biological apparatus, the former of which are of interest to rubber chemists.

THE BUFFALO FOUNDRY & MACHINE CO., BUFFALO, NEW YORK, has selected a landscape of unusual beauty and brilliancy of color, Thomas Moran's "Castle in Old Mexico, Built During the Days of Maximilian," to decorate its calendar for 1920. The picture,

17 by 25 inches in size, is finely reproduced and an ornament to any office.

AN INTERESTING WALL MAP ISSUED BY THE RUBBER ASSOCIATION of America, Inc., shows at a glance the location of each industry that is represented by members of the Association. The spots are crowded thickly in Massachusetts, Connecticut, New Jersey and Ohio; they make a good showing, too, in Rhode Island, Pennsylvania and Indiana. There are fourteen west of the Mississippi and five in Canada.

"The Hex," A MONTHLY HOUSE-ORGAN CONSISTING OF EIGHT pages, 12 by 14½ inches, is being issued by The Black & Decker Manufacturing Co., Towson Heights, Baltimore. The name is derived from the trade-mark of the concern which represents a hexagonal seal bearing the company's name. Each issue contains news of interest from the several departments of the organization and is illustrated with photographs and sketches.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

(796.) An inquiry has been received for the addresses of rubber manufacturers who make tubes which can be inflated and contracted vertically, each inside measurement of the container.

(797.) Inquiry is made as to the address of the present manufacturer of the Schirm dipping machine.

(798.) Request is made for standard inner tube specifications.

(799.) A subscriber asks where he can purchase pontianak resin.

(800.) An inquiry has been received as to where a sewing machine for stitching on tire shoes can be obtained.

(801.) A rubber manufacturer desires late information and formulas for making dipped and molded goods.

(802.) A request is made for the address of some rubber company that will make a few sample semi-solid rubber tires, the inquirer having his own mold.

(803.) Inquiry is made for the addresses of manufacturers of gutta percha tissue, for use by piano-player action manufacturers.

(804.) A reader asks information concerning "Azijnzuur," used for coagulating rubber on plantations.

(805.) A manufacturer requests information as to where he can obtain a machine for rolling finger cots.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number.

DISTRICT OFFICES.

New York: 734 Customhouse.
Boston: 1801 Customhouse.
Chicago: 504 Federal Building.
St. Louis: 402 Third National Bank Building.
New Orleans: 1020 Hibernia Bank Building.
San Francisco: 307 Customhouse.
Seattle: 848 Henry Building.

COOPERATIVE OFFICES.

Cleveland: Chamber of Commerce.
Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Los Angeles: Chamber of Commerce.
Philadelphia: Chamber of Commerce.
Portland, Oregon: Chamber of Commerce.
Dayton, Ohio: Dayton Chamber of Commerce.

(File No. FE-114.) A firm in Singapore wishes to get in touch with American firms interested in rubber, gutta percha, jelutong and other products.

(34,401.) A company in Egypt wishes to buy tires and accessories. Quote f. o. b. New York. Payment in United States currency; confirmed credit in New York bank.

(34,402.) A merchant in Canada wants to secure a distributing agency for automobiles and tires. Quote f. o. b. Canadian destination. Payment cash.

(32,413.) A man in Algeria wishes to secure an agency for the sale of automobiles and tires. Quote c. i. f. Algeria. Payment against documents. Correspondence may be in English.

(32,437.) Several firms in Syria wish to be put in communication with manufacturers and exporters of rubber goods.

(32,458.) General importers and exporters in Syria desire to be placed in touch with manufacturers and exporters of rubber goods.

(32,473.) A firm of engineers and contractors in Siberia wishes to get in touch with manufacturers and exporters to secure agencies for rubber goods for industrial purposes. Correspondence may be in English.

(32,476.) Firms in Syria wish to enter into relations for the purchase of rubber goods.

(32,502.) A commercial firm in Turkey desires to secure an agency for the sale of rubber overshoes. Quotations c. i. f. Turkish port. Correspondence may be in English.

(32,561.) American representative of firms in China wishes to get in touch with exporters for the sale of rubber-plantation machinery.

JUDICIAL DECISIONS.

FACTS IN THE SCHRADER CASE.

THE CASE of A. Schrader's Son, Inc., maker of tire valves, charged with violation of the Sherman Anti-trust Act, has so far been a contest on legal technicalities and not on the merits of the case. The decision of the Supreme Court, at the beginning of April last, remands the case for trial to the District Court of the Northern District of Ohio. The Schrader company was indicted about the time that the Colgate soap company was put on trial for conspiracy under the Sherman Law. It was averred that in selling their tire valves, valve parts and other tire accessories to wholesalers, they themselves fixing the prices at which they should be sold and declaring that they would not sell to anyone who did not accept their terms, violated the law. The company demurred to the indictment but the District Court overruled this and the case came up again in September last, the Schrader company expecting to contest it on the facts in the case.

On June 2, 1919, however, the Supreme Court gave its decision on the Colgate case (United States Reports, Volume 250, page 301), Justice McReynolds reading the decision. District Judge Westenhaver thought the two cases were similar and had the Schrader case argued again on the demurrer. He stated in his decision that he believed the Supreme Court had held in the Colgate case that a manufacturer could choose his own customers and announce in advance that he would only deal with such as maintained his prices. The only difference he could see in the Schrader case was that the prices appeared in a written license agreement which was signed by the tire-makers and jobbers. He consequently allowed the demurrer and dismissed the indictment.

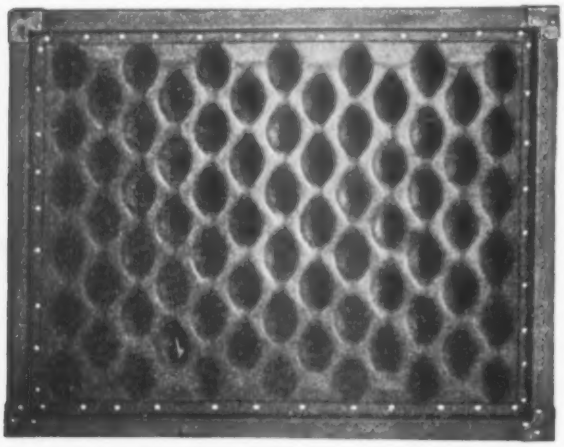
From Judge Westenhaven's decision the Government appealed to the Supreme Court which, on April 2, through Justice McReynolds, overruled the demurrer and sent the case back to the District Court to have the indictment tried. In the course of his decision, he intimated that there was a difference between the Schrader and the Colgate cases, and that the written agreement in the former's mode of business, constituted a violation of the law. That matter must be settled, however, in the trial which is to come.

RUBBER IMPORTERS LIMITED, to deal in crude rubber, has been incorporated in Singapore by the Rubber Importers & Dealers Co., Inc., New York City, which has had its own offices in Singapore for some time.

DIAMOND FIBER FOR RUBBER WORKING EQUIPMENT.

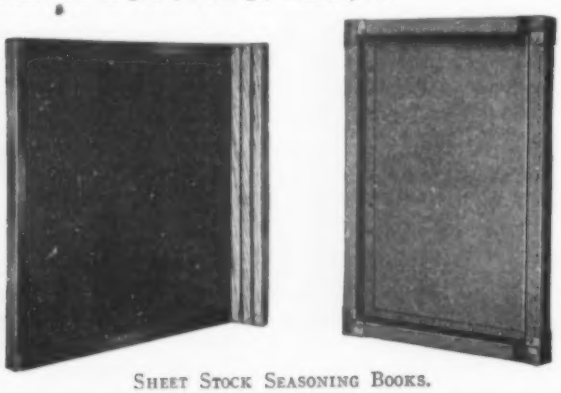
THE HARD, TOUGH, HOMOGENOUS MATERIAL with texture closely resembling horn, known as "fiber," is made from cotton cellulose, chemically hydrated. This product has remarkable properties and is being utilized by manufacturers everywhere in a great variety of products. Somewhat as in the case of rubber, new uses for it are daily being discovered.

Among rubber manufacturers fiber is being used for making such equipment as inner tube trays, bulb trays, books, boards, barrels, compound boxes and trucks. For all these purposes it is practically indestructible and for many other uses it is superior and less expensive than steel, brass, iron, tin, wood, vulcanite or leather. It is impervious to oil, grease or ordinary



STANDARD RUBBER BULB TRAY.

organic solvents, is unaffected by severe vibration, and may be worked into almost every conceivable form just as metals are machined. It cannot, however, be molded. Its tensile strength varies from 12,000 to 15,000 pounds per square inch and its resistance to compression, about 30,000 pounds per square inch. Its dielectric strength is approximately 200 volts per millimeter of thickness. The color incorporated in the material is permanent, the natural colors being gray, black and dark red, and the usual forms are sheets, rods and tubes, also special forms such as gears, bushings, washers, etc.



SHEET STOCK SEASONING BOOKS.

Fiber is especially adapted to use in rubber manufacturing because it eliminates all risk of damage to the uncured rubber by its freedom from splinters or roughness since fiber does not dent, split or crack and has a smooth, polished surface.

Another hydrolized cellulose fiber product of much interest to rubber manufacturers is that known as rubber parchmoid. This is a substitute for holland cloth at a cost of about 60 per cent less. It is strong and pliable with highly finished surface to which rubber will not adhere. It is water, air and oil proof and is especially suited as a wrapper for raw rubber.

The accompanying illustration shows a standard fiber bulb

RUBBER COMPOUND BOX.

tray in which impressions are made of the same shape as the uncured bulbs. A fiber angle frame is fastened around the bulb holder. This frame is made flat on top and bottom so that the frames can be stacked when not in use. Trays are usually made to hold 72 bulbs. Powdered soapstone is not necessary in using these trays.

Fiber seasoning books are made in dimensions as required. They are constructed with 1/16-inch fiber bottom. The wood frame is completely covered with fiber angles and reinforced with iron corner castings. There is a special construction for holding the leaves in place, and new leaves can be put in the book in less than three minutes. One type of book is specially designed for use in rubber footwear factories.

INNER TUBE SEASONING TRAY.

Fiber compound boxes are made extra strong to withstand hard usage in rubber mills. Fiber not less than .090 to .100-inch in thickness is used. The moldings are covered with metal and the corners protected with heavy steel castings. Snugly fitting joints prevent leakage or sifting of the contents and there are no projections to catch particles of the contents when the compound is dumped into the mixer. The boxes being slightly tapered can be nested when not in use; 24 by 18 by 12 inches is the standard size for compound boxes.

Inner tube trays have fiber bottoms with fiber angles securely riveted to the bottom. The flat, smooth heads of the rivets are on the inside of the tray. Two-inch hardwood molding covered with metal is used, with iron castings on the corners. These trays cannot splinter because there is no exposed wood and therefore the rubber tube is protected from puncture or injury. The usual dimensions of inner tube trays are 2 inches deep by 16 inches wide by 120 inches long.

THE DEPARTMENT OF AGRICULTURE ANNOUNCES THAT AFTER February 16, 1920, persons requesting the classification and certification of cotton, according to the Cotton Futures Act as amended by the Act of March 4, 1919, shall pay a fee of forty cents per bale.

Index to "Rubber Machinery" will be sent free upon request.

Annual Report of the United States Rubber Co.

THE TWENTY-EIGHTH ANNUAL REPORT of the United States Rubber Co., presented at the annual meeting April, 20, 1920, showed a gratifying business for the calendar year 1919. Net sales amounted to $225,589,465, an increase of almost $10,000,000 over 1918, the latter year including a large volume of business incident to the war. The net income before interest, but after providing for depreciation of plants and adequate reserves for Federal, Canadian and British taxes on income and profits, amounted to $21,396,099. Deducting $3,665,862 for interest charges leaves a net profit of $17,730,237. From this there remained to be deducted $5,041,476 for dividends on preferred stock, $19,567 for dividends on minority stock of subsidiaries, $720,000 for dividend on common stock paid October 31, 1919, and $1,378,576 for reserve for dividend on common stock payable January 31, 1920, leaving a balance for the year of $10,570,618 to be carried to surplus account. The surplus at the beginning of the year amounted to $41,848,051, from which $108,506 was deducted for adjustments made during the year, making the surplus as of December 31, 1919, $52,310,163.

The financial condition of the company, according to Chairman Colt, "was never better than it is to-day." Expanding business and advancing costs will in time require more capital. Sales so far this year "show a substantial increase over last year," and with the completion of new plant facilities, notably in the tire division, sales and profits, he believes, should be larger for 1920 than they were in 1919.

THE CHAIRMAN'S REPORT.

To the Stockholders of the United States Rubber Co.:

In compliance with the by-laws of the company, the chairman of the board of directors submits to the stockholders this annual report for the fiscal year ended December 31, 1919.

The financial statement, as compiled by the comptroller and certified by the public accountants, is appended hereto and made a part hereof. This statement gives a consolidated general balance sheet as of December 31, 1919, of the United States Rubber Co. and its subsidiaries, after excluding all offsetting accounts between the companies.

VOLUME OF BUSINESS AND PROFITS.

The net sales of the company for the year 1919 were $225,589,465, an increase of more than $10,000,000 over the sales of the previous year, which latter included a large volume of business incident to the war. This war business in 1918 was $25,000,000 greater than in 1919.

The net income before interest, but after making provision for depreciation of plants and adequate reserves for Federal, Canadian and British taxes on income and profits, amounted to		$21,396,099
The net interest charges amounted to		3,665,862
Thus leaving net profits for the year		$17,730,237
The dividends on United States Rubber Co. preferred stocks amounted to	$5,041,476	
The dividends on minority stock of subsidiary companies amounted to	19,567	
Making a total of		5,061,043
Leaving surplus for the year applicable to the common stock		$12,669,194
From which there was deducted:		
Dividend on common stock paid October 31, 1919	$720,000	
Reserve for dividend on common stock payable January 31, 1920	1,378,576	
Making a total for common stock dividends		2,098,576
Leaving balance for the year carried to surplus account		$10,570,618
The surplus at the beginning of the year amounted to	$41,848,051	
From which there was deducted for adjustments made during the year	108,506	
Thus leaving		$41,739,545
Making the surplus as of December 31, 1919		$52,310,163

AMENDMENT OF CHARTER.

At a special meeting of our stockholders held September 9, 1919, it was voted to increase the authorized first preferred stock from $70,000,000 to $100,000,000 and the authorized common stock from $40,000,000 to $200,000,000, and to retire the small remaining balance of second preferred stock, thus simplifying the capitalization of the company and providing the opportunity for future financing through the issuance of common stock when the same seems desirable.

INCREASE IN THE COMMON STOCK.

Pursuant to such action of the stockholders, an offering of our common stock of 100 per cent, or $36,000,000, was made at par, pro rata, to our common stockholders of record September 13, 1919, subscriptions being payable October 1, 1919, or in four instalments, at the election of the stockholder. All of the stock so offered was subscribed for by the stockholders, a very large percentage of stockholders electing to pay in full on October 1, and the company received, as of that date, $33,683,450, and the balance of $2,316,550 was thereafter paid in instalments as provided. The company, however, had the use of this money for but three months of the year, and a considerable amount was held to liquidate short time maturing obligations.

STOCK CARRIED FOR EMPLOYES.

With a view to increasing the zeal and efficiency of the employes of the company, by encouraging them to have direct personal interest in its success, your directors have from time to time provided through a "Stock Subscription and Profit Sharing Plan," a "Value Sharing Plan," and options on stock in certain special cases, for such employes to acquire such stock by carrying it for them for certain periods, over 4,500 employes being included this year in such plans. Your chairman cannot but feel that the enthusiasm and earnestness which such personal interest has engendered has had much to do with the unusual growth of our business and profits.

When the common stock was doubled in amount, the company through a subsidiary acquired and agreed to carry for not exceeding five years the additional amounts to which such employes were entitled to subscribe with respect to stock received by them or carried for them under such plans.

DIVIDENDS UPON COMMON STOCK.

In October, 1919, your directors placed our common stock upon an 8 per cent dividend basis, believing that they were amply warranted in so doing, and the earnings of the year together with the future outlook of business, would indicate that such action was conservative.

On January 8, 1920, the board of directors voted to distribute $9,000,000 of the surplus of the company, as a stock dividend of 12½ per cent, to common stockholders of record February 5, 1920.

It will be noted that the surplus of the year 1919 itself was sufficient to cover this stock dividend as well as the cash dividends paid.

INVENTORIES.

Inventories of manufactured goods and materials have been taken at cost where cost was below market, and at market where the market was below cost. The market today is generally above cost.

MAINTENANCE OF PLANTS.

The plants and properties of the company have been maintained as heretofore in the highest state of efficiency, and adequate reserves have been made for possible depreciation by charges against current earnings.

EXPANSION OF PLANTS.

In order to provide for the constant and rapidly increasing demand for its product of automobile truck and passenger car tires, the company commenced in the early part of 1919 a substantial expansion of its tire manufacturing plants both in the United States and in Canada. This expansion includes important developments at each of the company's five tire plants, and it is confidently expected that these improvements will more than double the productive capacity of the tire plants by the early part of next year.

All expansions and improvements have been made with a view to effecting every economy in manufacture and at the same time to maintaining the highest possible quality of the product.

SINKING FUND FOR RETIREMENT OF BONDS.

Pursuant to the requirements of the indenture securing the company's first and refunding mortgage 5 per cent gold bonds,

$690,000, being 1 per cent of the total amount of bonds issued, was paid to the sinking fund trustees on January 1, 1919.

The call for tenders resulted in the purchase of bonds to the par value of $793,000, and these bonds have been retired and the bonded indebtedness reduced by a like amount.

UNITED STATES RUBBER EXPORT CO., LIMITED.

The export sales of the company have increased over the previous year.

Adverse exchange conditions prevailing in some of our foreign markets were successfully met and a satisfactory profit maintained.

Your directors, realizing the value of export markets as a stabilizing factor and the importance of such an outlet, are continuing the policy referred to in the last annual report of maintaining and materially extending our export business.

GENERAL RUBBER CO.

Since 1904 this subsidiary has protected our requirements (now including our Canadian company) of crude rubber in a most satisfactory manner. On January 1, 1920, the name of their London branch, William Symington & Co., Limited, was changed to "General Rubber Co., Ltd." The General Rubber Co. now directly or through its subsidiaries entirely owns and operates our houses at London, Liverpool, Singapore, Colombo, Pará and Manáos. This efficient organization has been recognized by others to such an extent that outside dealers and manufacturers are entrusting to it a large portion of their orders.

RUBBER PLANTATIONS.

During the year 1919 the production of our plantations in Sumatra has shown a good increase over previous years due largely to the growth of the trees. It is our intention to continue the extension policy as rapidly as possible in order that eventually a much larger percentage of the rubber consumed by our factories may be obtained from our own plantations, and in connection with this it should be borne in mind that our consumption of crude rubber greatly increases from year to year. In this extension program, the company is not confining itself to Sumatra, which is under the government of Holland, but planted properties and areas suitable for planting already have been acquired in other territories, principally on the Malay Peninsula, which is under the British Government.

As stated in my report for 1918, the management of the present properties and the new areas being acquired and developed are under the direct control of the United States Rubber Plantations, Incorporated, the subsidiaries of which at December 31, 1919, were the Holland American Plantage Maatschappij, Si Pare Pare Rubber Maatschappij and Nederland Langkat Rubber Maatschappij, which together own over 90,000 acres in Sumatra, the planted area of which is over four times the size of any other American owned plantation and is the largest unit of rubber planted area in the world.

OUTLOOK FOR 1920.

The sales of the company so far this year show a substantial increase over last year. With the completion of our new construction now in process, notably in the tire division, our sales and profits for 1920 should be larger than they were in 1919.

GENERAL FINANCIAL CONDITION.

The financial condition of the company was never better than it is to-day. However, its expanding business, outlays for new construction to meet the same, and also the advancing cost of practically all materials entering into our manufactured product (with the one exception of crude rubber), will in time require more working capital.

FINAL.

I am pleased to make mention of the continued fidelity and ability shown by the officers, heads of departments, our Far Eastern and foreign staffs, and other employes of the company and its subsidiaries.

Respectfully submitted,
SAMUEL P. COLT, Chairman.

THE COMPTROLLER'S REPORT.

UNITED STATES RUBBER CO. AND SUBSIDIARY COMPANIES.

Consolidated General Balance Sheet, December 31, 1919.

ASSETS.

Cash		$20,037,646.20
Accounts receivable		40,770,427.90
Notes and loans receivable		1,377,339.05
United States Liberty Bonds and Victory Notes and Canadian Victory Bonds		3,479,902.15
Notes receivable of employes given for purchase of capital stock, secured by such stock to the par value of $9,709,900		8,576,043.41
Manufactured goods and material		87,633,699.00
Total current assets		$161,875,057.71
Securities owned and held in the insurance fund		2,331,778.75
Securities owned, including stock of United States Rubber Co. held by subsidiary companies		5,522,317.19
Plants, properties and investments, including rubber plantations		148,610,520.27
Prepaid and deferred assets		1,194,530.09
Total assets		$319,534,204.01

LIABILITIES, RESERVES AND CAPITAL.

Accounts payable and accrued liabilities		$22,902,570.50	
Acceptances payable for importation of crude rubber		1,430,148.20	
Notes and loans payable		0.00	
Total current liabilities			$24,332,718.70
United States Rubber Co. first and refunding mortgage 5 per cent gold bonds, due 1947	$68,207,000,000		
Less treasury bonds, deposited as security for United States Rubber Co. 5-year 7 per cent secured gold notes, due December 1, 1923	9,000,000,000	$59,207,000.00	
United States Rubber Co. 5-year 7 per cent secured gold notes, due December 1, 1923		6,000,000.00	
Canadian Consolidated Rubber Co., Limited, 6 per cent gold bonds, due 1946		2,600,000.00	
			67,807,000.00
Total liabilities			$92,139,718.70
General reserves		$13,021,666.29	
Insurance fund reserve	$1,825,138.51		
Employes accident fund reserve	776,370.21	2,601,508.72	
Reserve for depreciation of property and plants		14,812,254.16	
Reserve for dividend on preferred stock, payable January 31, 1920		1,260,442.00	
Reserve for dividend on common stock, payable January 31, 1920		1,378,576.00	
Total reserves			33,074,447.17
Capital stock—First preferred	$63,022,100.00		
Capital stock—Common	72,000,000.00		
Minority—Canadian Consolidated Rubber Co., Limited, stock	278,500.00		
Total capital stock		$135,300,600.00	
Fixed surpluses—subsidiary companies	$6,709,275.00		
Surplus	52,310,162.92	59,019,438.14	
Total capital stock and surpluses			194,320,038.14
Total			$319,534,204.01

Respectfully submitted,
W. G. PARSONS, Comptroller.

MANAGEMENT.

The management of the business is in the following competent hands:

OFFICERS.

Samuel P. Colt, chairman; Lester Leland, vice-chairman; Charles B. Seger, president; James B. Ford, vice-president; Homer E. Sawyer, vice-president in charge of footwear division; Elisha S. Williams, vice-president in charge of mechanical goods division; Ernest Hopkinson, vice-president in charge of development department; J. Newton Gunn, president of United States Tire Co. in charge of tire division; Samuel Norris, secretary; W. G. Parsons, vice-president and comptroller; H. B. Hubbard and William O. Cutter, assistant comptrollers; W. H. Blackwell, treasurer; John D. Carberry, assistant secretary and assistant treasurer; Sherwood S. Green, assistant treasurer; George E. Smith, auditor.

DIRECTORS.

James S. Alexander, Walter S. Ballou, James C. Brady, Nicholas F. Brady, Middleton S. Burrill, Samuel P. Colt, Harry E. Converse, Sir Mortimer B. Davis, James Deshler, James B. Ford, James Newton Gunn, Francis L. Hine, Ernest Hopkinson, Henry L. Hotchkiss, Lester Leland, Nathaniel Meyers, Samuel M. Nicholson, Raymond B. Price, Homer E. Sawyer, Charles B. Seger, William H. Truesdale, Theodore N. Vail, Frank A. Vanderlip, Elisha S. Williams.

EXECUTIVE COMMITTEE.

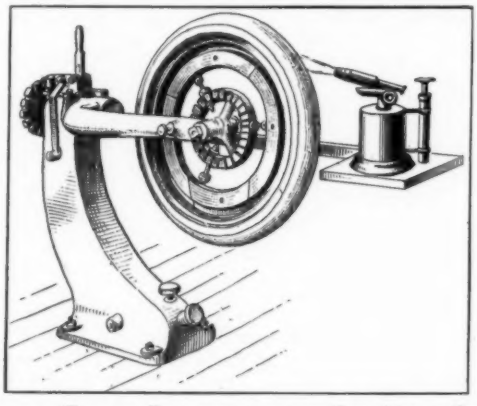
Samuel P. Colt, Lester Leland, Charles B. Seger, James B. Ford, Walter S. Ballou, Nicholas F. Brady.

THE BUNSEN BURNER IN RUBBER REPAIR.

By Arthur C. Squires.

EVERY RUBBER MAN knows that melting rubber spoils it, whether the rubber is vulcanized or not, but, like many other rules conserving rubber, there are exceptions. A well-known case in point is the sticking of the iron shafts into rubber wringer rolls. This has been done successfully for years by heating the shaft red hot and forcing it through the rubber roll. The hot iron melts the rubber that it comes in contact with and forms a tenacious film that is tremendously adhesive. Indeed, it is one of the strongest bindings known.

Along the same line is the melting of a vulcanized rubber surface for patching. This has also been done with a hot iron, but



PREPARING A TIRE FOR RETREADING BY THE BLUE-FLAME PROCESS.

a better way is to use a controlled blue flame; for this the Bunsen burner or blow-torch is ideal. A quick searing of a rubber surface—being careful not to scorch the fabric—effects a semi-devulcanization of the rubber surface and melts some of the rubber. A patch cemented on this never lets go. Hot water bottles, which are most difficult of repair, respond to this method better than to any other. So, too, inner tubes are exceedingly well mended by the blue-flame method. The applicability of it to auto tires has also quite lately been thoroughly demonstrated. Even auto tires which have been worn down nearly to the fabric of the carcass are being successfully semi-devulcanized and re-treaded by this new method.

It is not necessary to file, roughen or clean the worn parts of a tire, as has been customary. The blue flame removes all foreign matter, sulphur bloom, and moisture, leaving a clean, sticky surface. This is covered with a solution consisting of 5 per cent pure rubber dissolved in 95 per cent of carbon tetrachloride or benzol and given time to dry.

A new tread is best constructed by applying 2-inch-wide strips of unvulcanized tread stock to the sticky tread surface and stitching the strip smooth and fast all around the face of the tire. The new tread is formed of strips of semi-devulcanized stock cut to the desired width and thickness of the tread, superposed and stuck fast on the unvulcanized strip. Next a strip of unvulcanized tread stock cut wide enough to cover and overlap the built up tread completely around the circumference of the tire completes the assembly that is now ready to be cured in a sectional vulcanizer or retreading mold.

A complete new tread built on a tire 4½ by 35 inches requires 2½ pounds of new unvulcanized stock and 7½ pounds of vulcanized tire strippings. The weight of the retread stock used in retreading a tire should be known. This fact can be ascertained by vulcanizing a foot length of standard retreading stock in the mold free from contact with the tire.

The semi-vulcanized stock mentioned is thus prepared. Tread strippings from worn tires are cut to the proper width and the surface treated with the flame of the burner. The vulcanized rubber is semi-devulcanized and its surface rendered very sticky. After it is applied as a new tread and vulcanized it forms a very tenacious and durable stock at a small cost.

ALUMINUM IN THE RUBBER INDUSTRY.

STEEL AND IRON MANDRELS, molds and cores have been and still are very generally used in many branches of the rubber industry. Similarly maple forms or lasts have been the rule in the manufacture of rubber boots and overshoes. Steel, iron and wood leave much to be desired in the way of adaptability, though from differing causes.

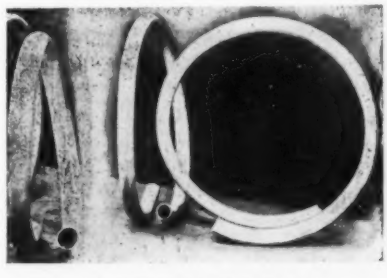
Mandrels, molds and cores are not only heavy to handle, but used in connection with the process of vulcanization are more or less seriously subjected to rusting and pitting, thus transferring rough and discolored surfaces to the rubber cured in contact with these defects.

Boot trees and lasts for large overshoes where made of maple wood are subject to deterioration by the heat of vulcanization and undergo a slow carbonization with the result that when continuously handled, as they are, the sharp angles wear away rapidly, thus changing the form and fit of the goods made upon them.

These defects have been very completely removed by the introduction of aluminum alloy to replace steel, iron and wood, particularly for the places indicated. A few facts with regard to aluminum will be of interest in this connection.

INNER TUBE MANDRELS AND CORES.

In the first place sulphur has no effect on it at all; further, it is light, having little more than one-third the weight of iron. This is important for the men who handle the mandrels. A two-inch aluminum tube ten gage and ten feet long will weigh about nine pounds, while the same mandrel in iron will weigh twenty-six. This makes considerable difference in the speed with which the mandrel can be handled. The illustration shows a couple of tube mandrels used in an English tire factory and in accordance with their usual practice they are curved to the form of the tire. Still it is found that the rubber tube is quite easily peeled off.



ALUMINUM MANDRELS.

Aluminum cores are also used for outer covers, but in the shape of a closed circle the joint in the metal being carefully welded. Tube mandrels are, of course, made of smaller tube in straight lengths, but whereas a steel one will weigh a hundred pounds the same apparatus in aluminum will only weigh thirty.

LABELS FOR BRANDING HOSE, TIRES, ETC.

Aluminum can be rolled very thin, in fact, nearly as thin as gold, and there is a great demand for strip about ten one-thousandths of an inch thick for brands. When a pattern or lettering has to be stamped on a rubber hose or tire it is, of course, necessary to interpose a thin strip of metal bearing the lettering or design to be impressed in the rubber. Some rubber manufacturers use tin for this purpose, but tin is more than three times as heavy, and although it costs more to the pound, aluminum is at least seventy-five per cent cheaper, because of the greater area due to its lesser gravity.

ALUMINUM TIRES AND LASTS.

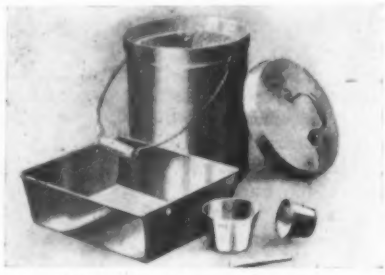
Rubber boots and overshoes are now made on aluminum lasts of a special alloy devised by a British company for this purpose. This metal pours freely into the mold, and is strong and easily

polished. The same metal can be applied to make the various molds used for other purposes in the rubber trade, etc.

The cast metal withstands heavy pressures employed in molding and as it polishes perfectly imparts a lustrous finish to the molded goods.

ALUMINUM ON THE RUBBER PLANTATION.

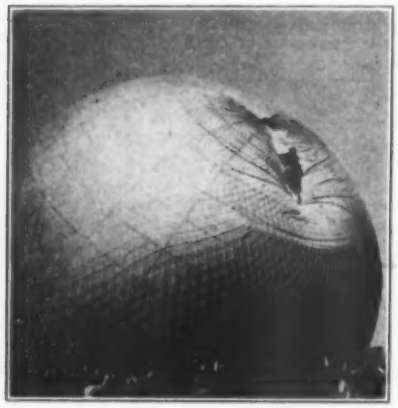
In the gathering and preparation of rubber latex a great variety of utensils is necessary. It is here that aluminum has found ready adaptability for its lightness and resistance to corrosion. Latex cups and spouts, collecting pails and coagulating pans, are a few of the aluminum accessories in daily use on a rubber plantation.



ALUMINUM LATEX UTENSILS.

EMERGENCY REPAIRS ON BALLOONS.

When an Army balloon in use is ripped, the soldier aeronauts do not nowadays exhaust the big rubberized silk bag of its gas in order to mend the rent. They have found that by swift, well-directed work such damage can be corrected readily on a filled balloon, and with a minimum loss of gas and time. As soon as the balloon breaks or is torn by contact with a tree, pole, chimney or other object, a hurry call is given and soon a crowd of soldiers surround and seize the big gas bag. By tugging at the ropes holding the basket they maneuver the balloon until the gaping part is turned underneath. The object of this is to save the hydrogen; for with the ripped side up the lighter-than-air gas soon escapes. Even when the torn part is below, there is much leakage, and, what is also objectionable, there is an admission of air, which if allowed to continue far, lessens the buoyancy and often necessitates refilling.



REPAIRING BALLOON, ROSS FIELD, CALIFORNIA.

While the gas bag is thus held captive the repairers pull the torn flaps together and hold them while others sew the torn section with a baseball stitch of stout linen thread. At the same time others prepare the cement of pure Pará rubber dissolved in naphtha, while others cut a patch of balloon material slightly larger than the torn part. The cement having been brushed on the patch and torn surface, the patch is applied and rolled down thoroughly with a hand roller. In a few minutes it is dry and the balloon ready for use again.

A disadvantage of the emergency repair is, that a patch can be put on one side (the outer) only, and the rolling has to be done against a yielding, cushion-like surface; although very good results are obtained by the resistance afforded by the distended bag, which is ordinarily inflated with about 18 pounds' pressure.

When time can be taken for a job the balloon is turned inside out and laid flat. Then a patch is applied on each side of the stitched part, the rolling is done against a hard, smooth surface, and the result is a bag that for all practical purposes is as good as new. The cement used in the slower and more thorough operation is the same as used in the hasty repair work.

PNEUMATIC TIRES FOR PACKARD TRUCKS.

A new line of pneumatic-tired trucks has been put on the market by the Packard Motor Car Co. of Detroit, in order to meet the demand for greater speed and wider expansion of transportation by motor trucks. The necessary gear ratios and machinery details have been carefully studied out. Demountable rim equipment is provided so as to make it easier to handle the giant size tires. The use of metal wheels of the spoke type renders it possible to employ a slot in the rim for the valve stem and thus enable the tire to be assembled on the wheel by rolling it into position and then sliding it over the wheel, instead of lifting tire and rim assembly so as to insert the valve stem through a hole in the rim, as is the practice with small, light tires.

The trucks are made in 1½-ton, 2-ton and 3-ton sizes, full details of each being given in the company's circular. The sizes of tires, all single pneumatic, are, for the 1½-ton trucks—front 36 by 6, rear 38 by 7; for the 2-ton trucks—front 36 by 6, rear 40 by 8; for the 3-ton trucks—front 38 by 7, rear 44 by 10. Just four sizes of tires are used.

FIFTY MILLION SMALL TIRES?

"The smallest automobile in earth" as far as we know is shown in the above picture. This little car was built by Fritz Reuter, of San Antonio, Texas, who operates a large automobile machine shop. He built the car of odds and ends from Fords to Pierce-Arrows.

This clever little piece of handiwork is run by electric motor and storage battery and is the result of one and one-half years of work during spare moments. The figure on the back of the car is a statuette of the widely known "Time to Re-tire" boy of The Fisk Rubber Co.

THE SMALLEST AUTOMOBILE.

Ten million six-year-olds equipped with these Lilliputian cars would use 50,000,000 tires. Added to what the grown-ups require it means a rubber shortage by 1925.

News of the American Rubber Industry.

FINANCIAL NOTES.

THE B. F. Goodrich Co. has issued $30,000,000 in four-year seven per cent convertible gold notes, due April 1, 1925, that at 98¼ and accrued interest will yield more than 7.40 per cent. These notes carry detachable warrants giving holders a call on common stock at $80 a share.

The Fisk Rubber Co. for the year ended Dec. 31, 1919, shows surplus after federal taxes of $3,994,657, equivalent after preferred dividends to $5.99 a share ($25 par) against $2,506,853 or $19.50 ($100 par) earned on $8,000,000 common stock in 1918. Net sales in 1919 were $43,613,975. Income account compares:

	1919.	1918.	1917.
Net profits	$4,956,685	$3,760,279	$3,578,484
Federal taxes	962,028	1,253,426	549,913
Balance	3,994,657	2,506,853	3,028,572
Preferred dividends	1,055,489	946,750	972,850
Deduction	*835,049	*589,659	475,685
Surplus	2,104,118	970,444	1,580,037

*Retirement preferred stock.

Stockholders of the Hood Rubber Co. voted to increase the authorized common stock of the company from $3,500,000 (of which $3,000,000 is outstanding) to $5,500,000. The $2,000,000 additional stock will be distributed as a stock dividend, to common stockholders of record April 10, in proportion of two new shares for every three shares now owned.

The Miller Rubber Co.'s sales for March, 1920, totalled $3,600,000, according to the company's report. Total sales for 1919 were $26,476,211, an increase of nearly $11,000,000 over the previous year. At the present rate the sales total for 1920 will be $50,000,000. Capitalization of the company was recently increased to $60,000,000 to care for an oversold condition.

DIVIDENDS.

The American Zinc, Lead & Smelting Co., St. Louis, Missouri, and New York City, has declared a dividend of $1.50 per share, payable May 1 on preferred stock of record April 15, 1920.

The Ames Holden McCready System, Montreal, Quebec, declared a quarterly dividend of one and three-quarters per cent, payable April 2 on preferred stock of record March 19, 1920.

The Canadian-Connecticut Cotton Mills, Limited, New York City and Sherbrooke, Quebec, Canada, recently declared a two per cent quarterly dividend, payable April 1 on preferred stock of record March 20, 1920.

The Canadian General Electric Co., Limited, Toronto, Ontario, declared the following dividends: two per cent quarterly on common stock, two per cent extra, and three and one-half per cent semi-annual on preferred stock, all payable April 1 on stock of record March 13, 1920.

The Corn Products Refining Co., New York City, declared the following dividends: one per cent quarterly and one-half of one per cent extra, both on common stock, and one and three-quarters per cent quarterly on preferred stock, all payable April 20 on stock of record April 5, 1920.

The Dayton Rubber Manufacturing Co., Dayton, Ohio, declared a quarterly dividend of $1.75 per share, payable April 1 on preferred stock of record March 20, 1920.

E. I. du Pont de Nemours & Co. (incorporated), Wilmington, Delaware, declared a quarterly dividend of one and one-half per cent, payable April 26 on stock of record April 10, 1920.

The First National Bank, Boston, Massachusetts, declared a quarterly dividend of four per cent and an extra dividend of one per cent, both payable April 1 on stock of record March 24.

The Globe Rubber Tire Manufacturing Co., Trenton, New Jersey, declared its regular quarterly dividend of one and one-half per cent and a stock dividend of ten per cent, both payable April 1, 1920.

The B. F. Goodrich Co., Akron, Ohio, has declared its regular quarterly dividend of $1.50 per share, payable August 16 on common stock of record August 5, 1920.

The Goudey Gum Co., Boston, Massachusetts, declared a quarterly dividend of $2 per share, payable April 1 on preferred stock of record March 27, 1920.

The Hood Rubber Co., Watertown, Massachusetts, has declared its regular quarterly dividend of one and three-quarters per cent, payable May 1 on preferred stock of record April 21, 1920.

The Kelly-Springfield Tire Co., New York City, has declared the following dividends: quarterly, cash $1 per share and stock three per cent, payable May 1 on common stock of record April 17; quarterly, $2 per share, payable May 15 on eight per cent preferred stock of record May 1, 1920.

The McGraw Tire & Rubber Co., Cleveland and East Palestine, Ohio, has declared its regular quarterly dividend of one and three-quarters per cent on outstanding preferred stock.

The Monatiquot Rubber Works Co., South Braintree, Massachusetts, declared a quarterly dividend of $1.75 per share, payable April 1 on preferred stock of record March 23, 1920.

The Mutual Tire & Rubber Corporation, New York City, declared an initial dividend of one per cent, payable April 19 on stock of record March 27, 1920.

The Standard Tire Co., Willoughby, Ohio, recently declared initial quarterly dividends of one and three-quarters per cent on preferred stock and of one and one-half per cent on common stock payable April 1 on stock of record March 25, 1920.

The Sterling Tire Corporation, Rutherford, New Jersey, has declared the following dividends: one per cent annual on common stock, eight per cent on eight per cent preferred stock, series B, and one and three-quarters per cent quarterly on seven per cent preferred stock, all payable April 15 on stock of record April 1, 1920.

The Tyer Rubber Co., Andover, Massachusetts, has declared its regular quarterly dividend of $1.50 per share, payable May 15, 1920, on preferred stock.

The United States Rubber Co., New York City, has declared quarterly dividends of two per cent on both common and preferred stock, payable April 30 on stock of record April 15, 1920.

The Winnsboro Mills, Winnsboro, South Carolina, declared a quarterly dividend of two per cent, payable April 1 on stock of record March 26, 1920.

The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, declared quarterly dividends of two per cent on its common and preferred stock, payable April 30 and April 15, respectively, on stock of record April 2, 1920.

LIBERTY BONDS A BETTER INVESTMENT THAN EVER.

Thrifty rubber workers are finding the present favorable market prices of Liberty Bonds a very profitable investment for their savings, and some of the large rubber companies are encouraging and assisting their operatives in the purchase of these securities. Owing to the great demand for $50 and $100

bonds the Treasury Department has issued instructions to the Federal Reserve Banks which will expedite the exchange of bonds of larger denominations for the small units. Ways and means are also provided whereby the smaller bonds may be obtained in the first instance.

NEW INCORPORATIONS.

Artcraft Tire Co., The, September 16, 1919 (Iowa), $1,000,000. A. Smith, president; L. C. Merritt, vice-president; B. F. Kraft, secretary and treasurer. Principal office, Des Moines, Iowa. To manufacture, sell and deal in rubber goods.

Baldwin Tire Co., March 31, 1920 (New Jersey), $100,000. H. M. Smith; K. M. Baldwin, both of 654 Clinton avenue; J. M. Baldwin, 27 Frelinghuysen avenue—both of Newark, New Jersey. Principal office, 27 Frelinghuysen avenue, Newark, New Jersey. Agent in charge, J. M. Baldwin. To manufacture, import, export, and buy automobile tires, supplies, etc.

Block Tire & Rubber Co., February 21, 1920 (Indiana), $1,500,000. G. R. Wilson, president and treasurer; L. C. Zebring, vice-president; E. N. Ely, secretary. Principal office, Lafayette, Indiana. To manufacture automobile tires and rubber goods.

Burlock Rubber Clothing Co., The, January 19, 1920 (Wisconsin), $250,000. C. Burlock, president; F. E. Foster, secretary, both of 297 Third street, Milwaukee; J. Sell, vice-president, 1012 Washington street; E. I. Fitzgerald, 313 Third street, both of Wausau—both in Wisconsin. Principal office, Wausau, Wisconsin. To manufacture, buy, sell, export, import and generally deal and trade in leather, rubber and gutta percha.

C. L. Tire Shop, Inc., April 20, 1920 (New York), $35,000. J. B. and D. L. Cothran, both of 125 Hamilton avenue, New Rochelle; C. G. Loew, Poughkeepsie, both in New York. Principal office, Poughkeepsie, New York. To manufacture auto tires.

Doyle Tire & Rubber Co., The, October 21, 1919 (Ohio), $300,000. D. A. Doyle, Jr., president and treasurer; M. J. Soply, vice-president and sales manager; F. H. Kelsey, vice-president; A. W. Doyle, secretary. Principal office, Doyle Block, Akron, Ohio. To manufacture cord and fabric tires.

Enterprise Vulcanizing Co., Inc., April 16, 1920 (New York), $10,000. A. and M. Herman, both of 205 Frost street; C. H. Paulsen, 402 Dean street—both in Brooklyn, New York. To do tire repair business, etc.

Everybody's Garter Co., Inc., April 20, 1920 (New York), $10,000. A. Landau, 836 Broadway, New York City; C. Weintraub, 995 Eastern Parkway, Brooklyn; M. Landau, Floral Park, Long Island—all in New York. Principal office, Floral Park, New York. To manufacture suspenders, garters, etc.

Ford Tire & Rubber Co., April 5, 1920 (Delaware), $3,000,000. F. R. Hansell; J. V. Pimm; E. M. MacFarland—all of Philadelphia, Pa. To manufacture tires.

Gillette Rubber Products Co., The, March 18, 1920 (West Virginia), $600,000. D. L. McConaughy; A. M. Replogle; S. Patterson, all of 928 Frick Building; C. O. Lind, 289 Union Arcade—both in Pittsburgh, Pennsylvania; T. S. Wilson, 19th and Prospect streets, Cleveland, Ohio. Principal office, Cleveland, Ohio. To manufacture automobile tires and other rubber products.

Gutta Percha Products Co., Inc., April 13, 1920 (New York), $20,000. K. F. Wallin, 1512 Pacific street; B. McMillan, 15 Aberdeen street, both of Brooklyn; J. J. Brawley, 1029 Ogden avenue, New York City—both in New York. To manufacture and deal in rubber, gutta percha, etc.

Habirshaw Electric Cable Co., February 28, 1920 (Delaware), authorized capital $1,350,000 preferred; 300,000 shares common, no par value. Principal office, 10 East 43rd street, New York City. Delaware agent, The Capital Trust Co. of Delaware. J. N. Shreve, president and treasurer; G. F. Waterbury, vice-president; I. S. Keith, secretary. To manufacture and sell insulated wires and cables and to hold stock of corporations engaged in a similar line of business.

Hennessy-Fennell Tire Co., November 15, 1919 (Iowa), $10,000. F. D. Hennessy, president and treasurer; E. A. Brown, vice-president; T. P. Fennell, secretary. Principal office, southwest corner Eighth and Nebraska streets, Sioux City, Iowa. To rebuild and repair tires.

Imperial Rubber Co., The, March 27, 1920 (Ohio), $25,000. F. T. Flinn, president, Ashland; S. S. Hobbs, vice-president, Oberlin; H. A. Flinn, secretary and treasurer; H. H. Hoberg, general manager; F. L. Strauss—the latter three of Orrville; all in Ohio. Principal office, Orrville, Ohio. To manufacture rubber sundries and specialties.

Industrial Rubber Corp., April 9, 1920 (New York), $100,000. L. Price, 894 Riverside Drive; N. Bolden, 305 West 148th street; E. L. Alexander, 385 Central Park West—all of New York City. Principal office, Long Island City, New York. To manufacture rubber products.

Jackson Tire & Rubber Co., April 5, 1920 (Delaware), $7,925,000. T. L. Croteau; M. A. Bruce; S. E. Dill—all of Wilmington, Delaware.

Kentucky Tire Pump Co., October 11, 1919 (Kentucky), $50,000. W. J. Ruby; H. H. Coil; E. B. Taylor—all of Madisonville, Kentucky. Principal office, Madisonville, Kentucky. To manufacture automobile accessories.

Knickerbocker Rubber Co., Inc., April 13, 1920 (New York), $25,000. Walter B. and Thomas B. McDonald, both of 646 56th street; J. A. McNamara, 442 Sixth street—both in Brooklyn, New York. To manufacture rubber tires, etc.

Lewen Patents, Inc., April 12, 1920 (New York), $500. M. H. Behr, 123 East 57th street; H. L. Lewen, 528 West 30th street, both of New York City; W. J. Boller, 318 Lincoln avenue, Rockville Centre, Long Island; both in New York. To deal in patents, tires, etc.

MacArthur & White, Inc., March 26, 1920 (New York), $5,000. W. MacArthur; A. R. White, both of Akron, Ohio; A. Paegelow, 2653 Decatur avenue, Fordham, New York City. To manufacture rubber goods.

National Steam & Stencil Works, Inc., April 7, 1920 (New York), $5,000. R. Count; C. Essinger, both of 472 Bainbridge street, Brooklyn; J. Engel, 1702 Woodbine street, Ridgewood—both in New York. To manufacture rubber stamps, stencils, checks, etc.

New York Tire Stores Corp., March 29, 1920 (New York), $250,000. S. and A. Jaffe, 2126 Vyse avenue; J. Liben, 32 West 111th street, both in New York City. To do tire business.

Orester Tire Co., Inc., April 3, 1920 (New York), $95,000. J. Orester, G. E. Scherer, C. J. Parker—all of Syracuse, New York. Principal office, Syracuse, New York. To conduct a tire business.

Rubber-Crêpe Manufacturing Co., Inc., April 2, 1920 (New York), $100,000. W. W. Lesselbaum, F. Druss, E. Eisenstein—all of 128 Broadway, New York City. Principal office, Queens, New York City. To manufacture rubber goods.

Scott Rubber Co., Inc., April 2, 1920 (New York), $125,000. G. L. Kerr, 790 Riverside Drive; W. H. Palen, 18 East 28th street, both in New York City; H. B. E. Scott, 26 Cottage street, Poughkeepsie—both in New York. Principal office, Poughkeepsie, New York. To manufacture rubber goods, etc.

Sewell Cushion Wheel Co., April 5, 1920 (Delaware), $1,000,000. T. L. Croteau, M. A. Bruce, S. E. Dill—all of Wilmington, Delaware. Head office, Detroit, Michigan.

Smith Rubber & Tire Co., April 14, 1920 (New York), $50,000. E. B. McCaffrey; R. L. Gray; I. M. Jacobson—all of 1777 Broadway, New York City.

Synthetic Leather & Waterproofing Co., March 29, 1920 (Delaware), $1,000,000. T. L. Croteau, M. A. Bruce, S. E. Dill—all of Wilmington, Delaware. To manufacture leather, imitation leather, belting, etc.

Tirometer Valve Corporation of America, September 30, 1919 (West Virginia), $250,000. J. Collins, president; G. P. Daniels, first vice-president; I. Pulverman, second vice-president and general manager; S. A. Moore, secretary and treasurer; T. J. Walsh, sales manager. Principal office, Charleston, West Virginia. To manufacture the Pulverman Tirometer valve.

FIRESTONE'S EASTERN SALES MANAGER.

JOSEPH E. MAYL, eastern sales manager of the Firestone Tire & Rubber Co., Akron, Ohio, is a native of Dayton, Ohio, in which city he was born December 15, 1888. His education was obtained in St. Mary's College, Dayton, and later in the University of Pennsylvania, Philadelphia.

JOSEPH E. MAYL.

Mr. Mayl began his business career with the Chalmers Motor Co. in June, 1909, and from September, 1910, until May, 1911, was with the Gordon Motor Co., Richmond, Virginia. On the latter date he came to the Firestone company as a salesman in the St. Louis, Missouri, branch and his advancement since that time has been rapid. In December, 1915, he was promoted to manager of the Memphis, Tennessee, branch and in May, 1917, was transferred in the same capacity to the Cleveland, Ohio, branch. December, 1918, found him New England district manager with headquarters in Boston, Massachusetts, and since January of the present year he has been eastern manager with headquarters in Akron, Ohio.

Obviously Mr. Mayl's record of achievement is still far from complete.

EUROPEAN FOOD DRAFTS.

Rubber companies are requested to inform their foreign-born employes concerning the plan of the American Relief Administration, 115 Broadway, New York City, of which Herbert Hoover is chairman, to facilitate the distribution of food in the European countries threatened with famine, by means of "food drafts." Those employes who are anxious to help their relatives in the home countries have been sending money, which is of little use, owing to the prohibitive price of food.

Food warehouses are now open at Hamburg for Germany, Warsaw for Poland, Vienna for Austria, Budapest for Hungary and Prague for Czecho-Slovakia, with branches in the principal towns. These depots will honor food drafts issued by American banks, and give out the food called for to the person to whom the draft is sent.

The plan is endorsed by the American Bankers' Association, the American Red Cross, the Y. W. C. A., and the Governments of the five countries involved. The food will be given out only at the warehouses and the buyer of the draft will be notified when the food has been delivered.

NEW PRESIDENT OF A. SCHRADER'S SON, INC.

CHARLES SCHWEINERT, the recently elected president of A. Schrader's Son, Inc., Brooklyn, New York, presents a notable instance of that constant advancement through long and faithful service which has been one of the chief bulwarks of success in American industry. Thirty-four years ago he entered the employ of the company in the capacity of office boy, and has ever since been associated with the growth and development of the concern from a small three-story factory in New York to the present seven-story fireproof building occupying an entire block in Brooklyn. He has an intimate knowledge of every detail of the business, gained from experience, and enjoys among the firm's workmen a wide popularity no less genuine than the esteem in which he is held among the men who have made and now direct the tire industry. Both rejoice for and with him in this culminating stage of his advancement.

CHARLES SCHWEINERT.

Mr. Schweinert is an ardent sportsman and numbers among his clubs the New York Athletic Club, the Columbia Yacht Club, Society of Automobile Engineers, Machinery Club and the Akron City Club.

STATEMENT AND BALANCE SHEET OF THE INTERCONTINENTAL RUBBER COMPANY.

THE DIRECTORS of the Intercontinental Rubber Company, 15 Exchange Place, Jersey City, New Jersey, have submitted to their stockholders the following balance sheet and statement of surplus account for the fiscal year ended December 31, 1919. The statements have been prepared and certified to by Messrs. Loomis, Suffern & Fernald, chartered public accountants, New York City.

CONDITIONS IN MEXICO.

Operations at the company's Torreon factory were suspended on June 30, 1919, due to decreased shrub deliveries and low crude rubber prices. Advantage was taken of the opportunity to carry out extensive repairs and alterations, the latter designed to decrease the cost of production and increase recovery of rubber. Prices having somewhat recovered and a satisfactory demand for guayule rubber having developed, operations were resumed on December 15. General conditions throughout Mexico have, on the whole, improved and it is believed that a recurrence of paralyzing disorder is improbable. Claims for physical losses and damage to property during the revolutionary period have been lodged with a Claims Commission constituted by the Mexican Government, and the case will be followed with due diligence.

AMERICAN CONGO COMPANY IN AFRICA.

A number of years ago it became apparent to the directors of your company that wild rubber could not be profitably produced from the African Concessions of the American Congo Company in competition with Malaysian plantations, which will this year produce 90 per cent of the world's supply. Various unsuccessful attempts were made to utilize the Congo Company's position to financial advantage, and in 1916 the option to purchase 500,000 hectares of land for Frs. 10,000,000 was allowed to expire, nothing having developed to warrant the expenditure of additional capital. Therefore, during 1919 the directors took advantage of an opportunity to sell the company's stock in the American Congo Company for $25,000 in cash plus a contingent interest in a claim against the German Government for rubber confiscated in Belgium. Although difficult to establish and collect, the claim may ultimately have a value to your company of $56,250. The established loss of $170,112.50 was charged on the company's books against the general reserve previously set up against contingencies of this character.

SUMATRA PLANTATION.

The development of the Sumatra plantation continues to show satisfactory progress, but with increased costs due to the fact that rice, the principal food of the estate laborers, now costs eight times the pre-war price.

ARIZONA GUAYULE PLANTATION.

Experimental work on the Arizona guayule plantation has continued with what the directors believe to be very encouraging results.

CHILEAN NITRATE SYNDICATE.

Your company has participated in a syndicate formed to purchase and exploit a large tract of proven nitrate land in the Republic of Chile. The enterprise is promising, but its final development may be held in abeyance until there is an improvement in the general situation with regard to new construction and the procurement of equipment.

INVESTMENT SECURITIES.

The item of Investment Securities is made up of Liberty Loans, bonds and short-time notes. As will be seen by reference to the Surplus Account, the sum of $58,202.27 was deducted from income to adjust this account to the market quotations of December 31, 1918.

BY ORDER OF THE BOARD OF DIRECTORS,
WILLARD P. SMITH, Secretary.

April 5, 1920.

CONDENSED BALANCE SHEET—DECEMBER 31, 1919.

ASSETS.

Investments in		
Merged and subsidiary companies:		
By cash	$3,762,159.09	
By stock issues	28,198,575.30	
		$31,960,734.39
Patents (exclusive of subsidiary companies)		15,141.77
Accounts and notes receivable, etc.:		
Advances to subsidiary companies	$305,653.71	
Sundry accounts	78,800.90	
		384,454.61
Advances on rubber		6,061.43
Investment securities		1,379,346.27
Cash		316,258.74
		$34,061,997.21

LIABILITIES.

Capital stock: common	$29,031,000.00
Accounts payable, taxes accrued, etc.	20,596.43
Reserve accounts	564,321.21
Surplus (as below)	4,446,079.57
	$34,061,997.21

SURPLUS ACCOUNT

Surplus December 31, 1918		$4,417,297.77
Total profits and income from investments, etc.	$215,237.25	
Less:		
Administration, general expenses and taxes	55,923.08	
	159,314.17	
Depreciation in market value of securities at December 31, 1919	58,202.27	101,111.90
		$4,518,409.67
Charges against surplus:		
Cost of caring for Mexican properties (or shut-down expenses) 1918-1919		72,330.10
Surplus December 31, 1919		$4,446,079.57

UNITED STATES TIRE PROMOTES SALES EXECUTIVES.

SUBSTANTIAL PROMOTION has come to six of the oldest executives in the sales department of the United States Tire Co. through the creation of six important new positions. The entire country has been divided into six large divisions, each to be under the direction of a sales manager, working directly under George S. Shugart, general sales manager.

In making these appointments the company has followed its custom of filling good positions with men developed in its own ranks, thus offering an incentive to those who remain in the organization to qualify for better places. It is worthy of note that the average length of service of the six appointees is eighteen years with the company, or with companies now merged with it.

E. H. Kidder, who advances from the position of Boston district manager to New England sales manager, has been a familiar figure in tire circles in New England for fifteen years. After six years as a salesman, he took charge of the United States Tire Company's Boston branch in 1911, and in 1916 he was made district manager. His activities have centered in Boston since that time, except for a year spent in the service of the Emergency Fleet Corporation during the war. The position to which he has just been promoted gives him supervision of sales throughout New England, with headquarters in Boston.

E. S. Roe, who becomes Eastern sales manager, with headquarters at New York, is one of the oldest tire men in the United States in years of service, and is unquestionably the dean of the tire fraternity in New York. Next year he will complete a quarter century in the tire business. His connection with the industry began April 1, 1896, when he entered the bicycle tire repair shop of the Hartford Rubber Works Co., in New York City, as a repairman, and worked up through various office positions to be counter salesman. When an uptown branch of his company was opened he was made manager, which meant little, for he was the only man there and did everything from sweeping out to selling.

In 1903 the two New York branches of the Hartford were consolidated and Mr. Roe became New York district manager. When the United States Tire Co. superseded the Hartford in 1911, he was made New York branch manager by the larger concern, and in 1913 took charge of the New York district.

Thomas R. Burton, who takes over the sales managership of the Detroit division, is a twenty-year man in the company's service. He began as salesman for Morgan & Wright in New York in 1900, and nine years later was made Boston branch manager by the same company. In 1911 he became Pittsburgh branch manager for the United States Tire Co., and in 1912 went to New York as assistant to the eastern district manager. In 1914 he assumed the duties of district manager at Atlanta, remaining there until 1918, when he acted for a time as district manager at Boston and later in an executive capacity in the general offices at New York City. In June, 1919, he was made district manager at Kansas City.

P. C. Anderson, western sales manager, began as an office boy 23 years ago at a wage of $2.50 a week, with Morgan & Wright, then located in Chicago. He worked up through various clerical positions, and in 1910 became assistant branch manager. On the formation of the United States Tire Co. he was made office manager at Chicago for the larger company, and a year later, central district office manager. In 1914 he took charge of the Minneapolis branch. Five years ago he became branch manager at Chicago, and on January 1, 1917, stepped up another grade to the position of Chicago district manager.

Harry H. Hubbard, southwestern sales manager, entered the company's employ in 1903 as a bill clerk in the office of the G. & J. Tire Co. at Indianapolis. He served in the adjustment department and as traveling salesman until 1911 when, upon the formation of the United States Tire Co., he became Indianapolis branch manager for the larger firm. From 1912 to 1917 he was branch manager at St. Louis, and then went to Minneapolis for a year as district manager. The next year he spent as district manager at Kansas City. For the past year he has acted as western manager of distributers' sales, with headquarters at Chicago.

The connection of William C. Price, new southern sales manager, with the company, dates back to 1908, when he began as a traveling salesman at Pittsburgh for the Hartford Rubber Works Co. In 1912 he became a salesman for the United States Tire Co. at Cincinnati, and made a record that brought him promotion to the place of branch manager and then district manager in that city. In 1918 he went to Dallas, Texas, and established the company's new Texas district, and in October, 1919, was made district manager at Atlanta.

E. H. KIDDER. E. S. ROE. THOMAS R. BURTON. P. C. ANDERSON. HARRY H. HUBBARD. WILLIAM C. PRICE.

GRAND RAPIDS TRUCK TERMINAL OUTGROWN.

The rapid growth of the "ship by truck" movement in various sections of the country seems to forecast a greatly increased consumption of truck tires, both solid and the new giant pneumatics. The Minneapolis truck terminal, described at some length in the December issue of THE INDIA RUBBER WORLD, has close parallels in Grand Rapids, Michigan; St. Paul, Minnesota; and Louisville, Kentucky, while others will be added to the list with the coming of spring. The Ship by Truck Bureau of the Firestone Tire & Rubber Co., Akron, Ohio, is largely responsible for the movement.

The Grand Rapids truck terminal, which operates under the name of the Associated Truck Lines of Grand Rapids, was started in June, 1919. There are now 19 routes operating 32

motor trucks. Goods from wholesale and retail stores are carried from 22 to 50 miles into the country and neighboring towns, while farm produce and miscellaneous goods are handled on the return trips. By this means Grand Rapids merchants have stopped the inroads of Milwaukee wholesalers on their business made possible by lake transportation. By September the terminal was forced to move to larger quarters and is now handling more than 170,000 pounds of freight daily.

MEETING OF COMMITTEE D13, AMERICAN SOCIETY FOR TESTING MATERIALS.

Committee D13 of the American Society for Testing Materials met at the United Engineering Societies Building, New York City, April 16, 1920, and adopted the report of the Sub-committee III on Testing Machines and also voted to adopt the General Methods for Testing Cotton Fabrics designated as D39-18T, following a few minor changes.

Important papers on "Testing Machines and Laboratory Procedure," by W. O. Jelleme, A. E. Jury, and E. H. Barnwell, preceded a general discussion of proper recommendations by the committee on type of testing machines for textiles and suitable capacities for fabrics of varying strengths. The variables affecting the indicated breaking strength of a fabric to which special attention was drawn in the paper above mentioned were: (1) the design of the jaw; (2) machine capacity; (3) machine rate of load; (4) speed of pulling jaw.

The committee's recommendation in the matter of suitable machines for textile testing favored the inclined balance of pendulum type, limiting the use of individual machine to that capacity corresponding to the pull exerted when its pendulum makes an angle with the vertical not exceeding 40 degrees, beyond which point the rate of loading varies sufficiently to make accurate comparative tests impossible on machines of different capacities. The rate of loading recommended is 250 pounds per inch of travel of the head jaw, namely, the jaw attached to the dynamometer.

"The Measurement of Crimp in Yarns and Fabrics," by A. N. Gadsby and E. D. Walen, of the Textile Research Co., stated that crimp should be considered as the difference in distance between any two points on a yarn in a fabric and between the same two points after the yarn has been removed and straightened. The importance of determining crimp is indicated by the fact that the difference between the crimp of the warp and the filling of a tire fabric, designated as "off square," shows the disproportion in which the strain on the fabric will come in the finished tire.

Other papers of interest were "Possibilities of Air Conditioning for Textile Testing Laboratories," by A. M. Thompson, of the Cramer-Parks Company; "Moisture Effects upon Ducks of Varying Weights, and Fabrics of Unusual Character"; also "Variation of Apparent Strength with Machine Capacity," by G. B. Haven; "Experiments on Impact Testing for Fabrics," by E. D. Wallen, briefly discussed the breakage of groups of yarns from fabrics by their resistance to breaking by the sidewise impact of a swinging pendulum.

RUBBER BOOTS AND RAINCOATS FOR THE ARMY.

During the war the Clothing and Equipage Division of the Quartermaster General's Office bought 2,885,092 pairs of rubber hip boots at a cost of $14,616,432 and 8,329,791 raincoats at a cost of $44,932,308. In the first year of the war, from April 1, 1917, to June 30, 1918, the unit price of boots was $4.82 and the 1,370,619 pairs cost $6,606,384; in the year, June 30, 1918, to June 30, 1919, the price was $5.289, and the 1,514,473 pairs cost $8,010,048. The stock on hand to be accounted for on June 30, 1919, was 687,781 pairs, of which 116,202 were at supply depots, 600 at camps and posts, and 571,069 were overseas or in transit; 102,148 pairs were lost at sea during the war.

The price of raincoats the first year was $5.21 so that the 4,744,822 supplied cost $24,720,523. In the second year they had devised different coats for foot and mounted men. The raincoats for the latter cost $5 each so that $330,000 was paid for the 66,000 coats furnished. Most of the coats, however, were for the men who had to march, the price being $5.65 and the 3,516,369 raincoats supplied cost $19,878,785. The number in stock on June 30, 1919, was 354,965 infantry and 25,457 horsemen's coats in the United States and 886,464 raincoats in all overseas, making a total of 1,264,886 coats on hand. Besides these, 34,990 raincoats had been lost at sea.

GENERAL MANAGER, SYRACUSE RUBBER CO., INC.

GEORGE R. LOGGIE, treasurer and general manager of the Syracuse Rubber Co., Inc., Syracuse, New York, was born March 27, 1882, in Aberdeen, Scotland. Coming to this country with his people when a boy, he early set out to take care of himself, his only assets being a healthy body and an active, ambitious mind. In 1901 he entered the factory of the Diamond Rubber Co., Akron, Ohio, as a laborer and learned the manufacture of tires from the bottom up. From that time to the present he has been identified with the tire business in various capacities. He found time, however, to attend night school and eventually became an instructor in a business college which he attended. For a time he was a salesman for the Miller Tire & Rubber Co., and afterward was placed in charge of the Miller branch at Syracuse, New York.

GEORGE R. LOGGIE.

After a few years in Syracuse he tried to start a tire factory and failed, but one failure did not discourage him, and in 1919 he organized the Syracuse Rubber Co., Inc., and was elected treasurer, general manager, and a member of the board of directors.

Mr. Loggie is a member of the Elks and of the Optimist Club and is popular socially as well as in business circles.

W. R. GRACE & CO. PIONEER RUBBER IMPORTERS.

The interest of W. R. Grace & Co. dates back to 1854, when a group of rubber boot and shoe manufacturers appointed the firm their sole importing agent. The growth of the business brought about the formation of Sears & Co. in 1859 as a branch house at Pará and Manáos, and most of the rubber consumed in the United States passed through the hands of W. R. Grace & Co. From the early 'seventies until 1886 the greater portion of the crude rubber coming into New York went to that firm.

With the attempt of Charles R. Flint to monopolize the rubber market, Mr. Grace undertook to withdraw from the rubber trade, but to do this completely was impossible with an importing house of such magnitude. The dealings, however, were as small as possible till Mr. Grace died in 1904.

When plantation rubber became of importance, W. R. Grace & Co. became interested in crude rubber again, and since 1912

have had agencies in the principal markets of the world, London, Pará, Manáos, Singapore, Batavia, Medan, and Ceylon, with many correspondents throughout South America and the Orient.

C. KENYON CO. TO MANUFACTURE CORD TIRES.

On April 1, the C. Kenyon Co., Brooklyn, New York, operating the largest fabric rubberizing plant in the United States, started manufacturing Kenyon Cords, a new high-grade cord tire.

KENYONS' PLANT, BAY RIDGE, BROOKLYN.

Back of the Kenyon entry into the tire manufacturing field are over sixty years of experience in handling and manipulation of rubber, and the resources of a great plant equipped with modern tire-making machinery.

The decision of the Kenyon company to make cord tires is a logical development of their business and previous history. Starting in 1857, the company had acquired through long and varied experience an intimate and unique knowledge of rubber, its compounding, and its application to fabric. The two plants on Pacific street, Brooklyn, and on the Bay Ridge waterfront employ nearly 3,000 persons, and the products range from raincoats to the large rubber blankets used in offset printing plants. The company has been successful in producing cord fabrics for other tire manufacturers, and it is natural, in view of this, that the Kenyon brothers should decide to begin the manufacture of tires.

KENYONS' PLANT, PACIFIC STREET, BROOKLYN.

The Kenyon company intends to produce oversize cord tires of the highest grade exclusively. Furthermore, the Kenyons have patented a new tread of rectangular form and truly non-skid properties because it offers a straight line resistance to both the side and forward skid. The tires are to be made at the Bay Ridge factory, a building of modern concrete construction and equipment, completed only last year, and having an initial capacity of 500 tires daily with provision for enlargement.

Besides every mechanical feature known to make the building safe, the factory contains such provisions for the service and health of the employes as a cafeteria with food at cost, recreation and smoking rooms, a roof garden and a finely-equipped hospital with a competent medical staff.

GOVERNMENT SALE OF HIP BOOTS AND OVERSHOES.

The director of sales of the War Department announced that the Surplus Property Division of the Quartermaster General's office had disposed of rubber goods at the subjoined prices, on the bids received up to the afternoon of February 15, 1920:

New rubber hip boots: 120 pairs at $4.00, 120 at $3.65, 600 at $3.271, 2,000 at $3.25, 120 at $3.15, 240 at $3.10, 3,000 at $3.065, 1,000 at $3.015, 120 at $3.00, 840 at $2.90, 5,740 at $2.85, 1,200 at $2.775, and 48,520 at $2.75, nearly all of the last to one company.

New all rubber overshoes: 200 at $2.05, 200 at $2.00, 200 at $1.75, 2,400 at $1.50, 6,142 at $1.49, 250 at $1.465, 1,000 at $1.45, 200 at $1.41, 2,000 at $1.40, 4,480 at $1.35, 1,000 at $1.33, and 67,440 to one company at $1.29.

GEORGE W. SHERMAN, SALVAGE EXPERT.

GEORGE W. SHERMAN, for many years connected with The B. F. Goodrich Co., and now devoting his time to the development of the Akron Industrial Salvage Co. and other personal interests, graduated from the Massachusetts Institute of Technology in 1894 and immediately became connected with Colgate & Co., soap manufacturers, as assistant mechanical engineer. He was later identified with the Boston Woven Hose & Rubber Co. as master mechanic, and subsequently entered business for himself in Boston as a consulting mechanical engineer.

GEORGE W. SHERMAN.

Late in 1901 he came to Akron and was sent to Liverpool, England, by the stockholders of The Diamond Rubber Co., which at that time owned the Northwestern Rubber Co., of Liverpool. This company was engaged largely in reclaiming rubber, and Mr. Sherman served there as superintendent. Coming back to Akron several years later, he became the first mechanical engineer of the Alkali Rubber Co., now The Philadelphia Rubber Works Co. In 1908 he returned to the Diamond Rubber Co. and assumed charge of all by-product, scrap and salvage work, continuing as the head of these departments and in the same capacity for The B. F. Goodrich Co. after the consolidation, until his resignation on January 1 of this year.

It was during the war that Sherman organized the Akron Industrial Salvage Co., having as its members one hundred and twenty-five Akron manufacturers and merchants. The value that these members gained from their waste products so increased the scope of the work that it now calls for practically all of Mr. Sherman's time. His plan of organization was so thorough and effective that the Department of Commerce issued a special government bulletin dealing with the detailed development of the plan and its vast possibilities.

In addition to his other activities, Mr. Sherman is also in charge of the chemical department of The McAdoo-Akron Co., a new corporation recently organized to manufacture a rubberized cotton work glove.

EASTERN AND SOUTHERN NOTES.

By Our Regular Correspondent.

THE FISK RUBBER CO., Chicopee Falls, Massachusetts, has added to the site of its proposed building at Broadway, Eighth avenue, and Columbus Circle, New York City, the properties at Nos. 956-958 and 960-962 Eighth avenue.

The United States Rubber Reclaiming Co., Inc., will occupy temporary quarters at No. 20 West 60th street, New York City, pending the erection of its new building.

The Rubber Importers & Dealers Co., Inc., New York City, has increased its authorized capital from $500,000 to $1,000,000, and will remove on May 3 from its present location at Nos. 67-69 Wall street, to larger quarters at No. 200 Broadway.

The Triplex Tire Corporation, 903 Sixth avenue, New York City, has changed its name to Martin Tire Corporation. James Martin is president. The "Mono" cord tire and "Martin" supercord tire, manufactured by this concern, were illustrated and described in our issue of February 1, 1920, on page 300.

Alfred Smith, Limited, dealer in chemicals for the rubber trade, will remove on May 1, 1920, from 98 Maiden Lane to Room 25, No. 98 Park Place, New York City.

Charles E. Wood, crude rubber broker, has removed from 149 Broadway to 287 Broadway, corner of Reade street, New York City.

In order to promote fraternalism among New York City rubber trade employes, the Rubber Trade Employes Social Society held an informal supper and dance at the Hotel McAlpin, April 14, when a very enjoyable evening was spent by the three hundred attending.

Pell & Dumont, Inc., dealer in crude rubber, has removed from 68 Broad street to 6-9 Hanover street, New York City.

Edwin M. Berolzheimer has been elected vice-president of the Eagle Pencil Co., New York City, in charge of factory operation.

The Morse Chain Co., Ithaca, New York, has moved its Greensboro, North Carolina, office to 404 Commercial Bank Building, Charlotte, North Carolina, where a complete exhibit of chain drives will be in operation. George W. Pritchett is southeastern manager.

Dunlop America Limited has closed its temporary office in New York City and established its whole staff in temporary quarters on the site of its new factory at Buffalo, New York. Quarters have been built to take care of 1,000 workmen on the new plant, and about 1,200 are being employed on the project. The foundations of some of the buildings are already completed and towers erected for the pouring of concrete for the finished-product warehouse, to be 560 feet long and four stories high. P. D. Saylor is vice-president and general manager. Mail for the company should be addressed to Postoffice Box No. 448, Buffalo, New York.

The Hewitt Rubber Co., Buffalo, New York, is building a two-story addition to its office building, which will cost approximately $25,000.

The Hydraulic Press Manufacturing Co., Mount Gilead, Ohio, has opened an office in the Mutual Life Building, Buffalo, to take care of business in that territory. R. K. Havlicek is in charge.

E. I. du Pont de Nemours & Co., Wilmington, Delaware, has elected the following directors for the ensuing year: F. D. Brown, H. F. Brown, E. G. Buckner, R. R. M. Carpenter, Walter S. Carpenter, Jr., Frank L. Connable, William Coyne, A. Felix du Pont, Alexis I. du Pont, Eugene du Pont, Eugene E. du Pont, H. F. du Pont, Irenée du Pont, Lammot du Pont, P. S. du Pont, J. B. D. Edge, H. G. Haskell, J. A. Haskell, J. P. Laffey, C. A. Meade, Charles A. Patterson, Charles L. Patterson, F. W. Pickard, H. M. Pierce, John J. Raskob, Charles L. Reese, W. C. Spruance, and F. G. Tallman.

Yarnall-Waring Co., Chestnut Hill, Philadelphia, has recently opened an office in the Candler Annex, Atlanta, Georgia, in charge of D. T. Newman, formerly with the Philadelphia sales office.

The factory staff of the New Castle Rubber Co., New Castle, Pennsylvania, as recently organized, consists of: L. C. Sturgis, works manager; K. E. Rogers, purchasing agent; C. A. Hemingway, manager material service; V. C. Hossellman, manager factory accounting; Willis H. Grant, chief chemist; F. T. Zesiger, operating superintendent; R. J. Carl, material preparation superintendent; M. H. Daniels, technical superintendent. C. L. Copley, formerly operating superintendent, has been placed in charge of the cord tire development department.

THE RUBBER TRADE IN NEW JERSEY.

By Our Regular Correspondent.

TRENTON NOTES.

THE TRENTON RUBBER MANUFACTURERS began to feel some uneasiness over the recent railroad strike because of the scarcity of coal and the fact that raw materials might run short. The Empire Rubber & Tire Corp. was the only rubber plant that was compelled to shut down for a couple of days because of the scarcity of coal. The plant is now in full operation again. The various rubber companies have their warehouses overcrowded with goods due to the strike and it will take some time to get the product started on the road. Meantime, customers were compelled to wait for the shipment of supplies. Fortunately the Trenton concerns had enough raw materials on hand to tide them over the strike.

Hyman A. Rosenthal, proprietor of the Nearpara Rubber Co., 79 Prince street, Trenton, whose plant was destroyed by fire a short time ago, has awarded a contract for a new structure. The main plant will be constructed of steel, one story in height, and will measure 100 by 125 feet. There will also be a boiler room and power plant attached. The company expects to be ready for operation again by June 1. The machinery, which was badly damaged by flames, will be overhauled and rebuilt by the William R. Thropp & Sons Co., of Trenton. The fire entailed a loss of between $90,000 and $100,000. A temporary office building has been erected to take care of business until the new works is completed.

Andrew Wurfflein, father of Peter E. Wurfflein, Canadian representative of the New England Rubber Co., died recently at his home in Trenton.

John A. Lambert, treasurer of the Acme Rubber Manufacturing Co., who was recently made president of the Trenton Chamber of Commerce, has stirred up the Trenton merchants by declaring that outrageous profiteering is being carried to extremes. He has called a meeting of the merchants to discuss the high cost of living. He has also taken up the question of a shortage of houses in Trenton, and says that he finds that the scarcity of dwellings is not as great as reported.

The Pocono Rubber Cloth Co., which recently purchased the plant of the Howard Demountable Rim Co., Trenton, and 4½ acres of land, has awarded a contract for the erection of extensive additions. The contract calls for the erection of a power house, 43 by 45 feet; an engine room, 25 by 70 feet, and a drying and unloading building, 26 by 170 feet. The buildings will be one story, of brick and concrete, and the entire work will cost about $50,000. There will also be another structure to house two large vulcanizing rooms. The work is to be completed in eight weeks.

The Acme Tire Co., of which W. Bradford Stryker is general manager, is having a new building erected on East Front street, Trenton. The company's present home will be razed to make room for city improvements.

The Ajax Rubber Co., Inc., Trenton, recently gave an entertainment at the Crescent Temple and had as guests its 1,200 em-

ployes and their families. All the higher officials of the company were present when manager Louis P. Destribats announced that the concern had decided to grant free life insurance to all the employes of the works. At the entertainment exclusive motion pictures were shown and the guests enjoyed a banquet and dancing. The company reports conditions prosperous and will shortly enlarge the plant.

William J. B. Stokes, treasurer of the Thermoid Rubber Co., and Mrs. Stokes have left for an extended trip through the West Indies and Panama. They will be absent for several weeks and will stop at Havana, Kingston, Santiago, Costa Rica, Panama and the Bahama Islands.

MISCELLANEOUS NEW JERSEY NOTES.

The Manhattan Rubber Manufacturing Co., of Passaic, New Jersey, will build a plant on the Whippany River, near Morristown, for the purpose of reclaiming rubber. Several buildings of reinforced concrete, to cost $500,000, will be erected and the company will employ 250 men. Later, homes for the workmen will be erected.

The Lambertville Rubber Co., Lambertville, New Jersey, will erect a large brick building along the creek and will eventually do away with the present frame factory buildings. The company will also erect a brick building for its printing office.

The Rubber Celluloid Products Co. will erect a one-story brick storage building at its plant at Newark, New Jersey, 39 by 69 feet, at a cost of $11,000.

During the recent transportation tie-up the Somerset Rubber Reclaiming Works, New Brunswick, New Jersey, maintained a fleet of motor trucks in constant operation to afford their customers prompt service.

The Intercontinental Rubber Company, Jersey City, New Jersey, at its annual meeting on April 5, elected the following officers and directors: G. H. Carnahan, president; E. B. Aldrich, vice-president; J. C. Treadwell, vice-president; W. P. Smith, secretary and treasurer; G. Harrington, assistant secretary; directors—G. H. Carnahan, chairman; E. B. Aldrich, H. A. Bingham, C. A. Corliss, W. Dutton, J. R. Morron, Elton Parks, W. C. Potter, F. T. Rosen, C. H. Sabin, W. P. Smith, and H. H. Vreeland.

The Fulton Rubber Type, Ink and Pad Company, which was incorporated under the laws of New Jersey, December 13, 1905, changed its name on June 11, 1915, to Fulton Specialty Company. The principal office is now located at 128-142 Fulton street, Elizabeth, New Jersey, and the agent in charge is E. Rogers Underwood. The authorized capital stock of the company is $150,000, and the company manufactures stamp pads, rubber type, daters, etc.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

WHILE there is little change in the business situation among the Rhode Island rubber mills, the textile establishments engaged in the production of tire fabrics throughout the state, are being driven to their utmost capacity with day and night shifts. Nearly every concern now identified with this growing branch of the rubber industry either has new buildings in process of construction, or is planning extensions of a material size.

The majority of the rubber industries are still rushed with work and have plenty of orders ahead, but the problem of securing enough help is a handicap to many manufacturers who are also confronted by labor unrest. Nor is the shortage of help the only contingency. Railroad strikes with the consequent tie-ups, embargoes, and congestions of freight by rail and by boat, prevent the transportation of supplies and finished products, while the steadily skyrocketing of wages and shortening of hours add to the general disorganization.

Because of the embargo on freight, by both rail and water, the National India Rubber Co., Bristol, early in the month chartered a small 200-ton steamer to help out in the unusual emergency that arose primarily through the strike of longshoremen in New York, and was added to by the consequent strike among the railroad employes. The steamer brought to Providence 175 tons of freight from New York, and loaded all she could carry of the nearly 1,000 tons which had accumulated at the State Pier waiting for transportation. Otto B. Munroe, traffic manager of the Revere Rubber Co., was in charge of the work.

One of the most interesting and important events of the past month in connection with the whole rubber industry was the transportation of upwards of 1,000,000 pounds of cotton fabric, valued at $2,500,000 from Providence and vicinity, to Akron, Ohio. The shipment was made on 100 automobile trucks and was for the purpose of relieving the shortage of tire fabric, due to the railroad strike through the Middle West and the resultant express and freight embargoes. This is said to be the biggest truck transportation venture ever attempted from the East, both in point of distance and volume, as well as in value. The material was collected from the following mills in this vicinity, which usually ship the cotton fabric to Akron by the railroads: Connecticut Mills, Danielson, Connecticut; Naushon Weaving Co. and Passaic Cotton Mills, New Bedford, Massachusetts; Jenckes Spinning Co., Pawtucket, Rhode Island; Ninigret Mills and Westerly Textile Co., Westerly; and Goodyear Cotton Mills, Inc., Killingly, Connecticut.

Each fleet averaged twenty trucks, headed by a pilot car. Spare trucks for use in case of emergencies were placed along difficult parts of the route in the mountains where the regular machines might break down. The contents of each truck was insured at $25,000 for the trip. The cotton fabric is valued at $2.50 a pound, so that the 1,000,000 pounds which were moved within a week was worth $2,500,000. The use of trucks will be continued at least until freight service becomes normal, the trucks returning here from Akron loaded with western products which have a market in this vicinity, so that no truckage distance is wasted.

About 500 members and friends were present at the first annual dance of the Davol Rubber Company Benefit Association, Providence, held on April 16. A short address on the benefits to be derived from membership in the association was given by general manager Wesley. The association is open to all persons over 16 years of age employed by the concern. The officers are as follows: president, Joseph Harris, Jr.; vice-president, M. Burnham; secretary, A. Goff; treasurer, C. Bamford; directors—Frederick Keenan, Anna Riley, Nellie Ward and Thomas Ryan.

The Goodby-Rankin Co., with headquarters at Providence, has opened its new quarters at 37-49 Snow street, removing thereto from 57 Westminster street, where the company has been located for nearly twenty years. The new building has four floors and a large basement, with two elevators for freight and a large sunny show and salesroom, with every facility for handling the firm's large tire trade.

The Hayward Rubber Co. is fitting up a new store on Union street, near Washington street, Providence. There will be new balconies, show cases, counters, new entrance, new windows, hardwood floors, steel stairways and paneled work.

The O'Bannon Corporation, at West Barrington, Rhode Island, will erect a 100,000-gallon water tank on its premises, for fire protection.

Good progress is being made on the new mill being erected for the Mount Hope Spinning Co., Warren, Rhode Island. This concern has been operating 13,000 spindles on tire fabric, but with the new mill 26,000 spindles will be available. The new structure, which is 200 feet long, and two stories high, will be occupied the first of August. A new warping room extension

is being erected which almost connects the old and the new structures. Other improvements are under consideration and it is expected that the coming summer and fall will witness numerous additions to this plant and its equipment.

The Ninigret Co., manufacturers of tire fabrics, is enlarging its plants at both Pawtucket and Westerly, Rhode Island, to practically double their capacity, by the purchase of property adjacent to its present holdings. It intends to erect new buildings of the latest type, to be equipped with modern up-to-date machinery. During the past month the concern has purchased a large tract of land on Middle and Fountain streets and Central avenue, in Pawtucket, the revenue stamps affixed indicating an outlay of approximately $39,500. Only a short time previous the corporation purchased property immediately adjoining its plant in Pawtucket, at a cost of $35,000.

Work is to be started soon on a $15,000 brick addition, one-story high, to the plant of the Phillips Insulated Wire Co., at Pawtucket. It will be 45 by 81 feet, of mill construction with steel beams. Other additions and improvements will probably be carried into effect during the coming summer.

The American Wringer Co. is erecting a new building on Social street, Woonsocket, where rubber-covered mechanical rolls will be made. It is to be a three-story brick structure, 180 by 60 feet, and will be completed early in October. More than 100 hands will be employed in the new mill.

THE RUBBER TRADE IN MASSACHUSETTS.

By Our Regular Correspondent.

RUBBER GOODS amounting to $20,757,875 represented about one-thirteenth of the value of all manufactures in Massachusetts for the year 1918, according to the thirty-third annual report of the director of statistics, which has just been published. Substantial gains over the previous year are shown, and the state still maintained its leading position in the manufacture of rubber boots and shoes.

Eight establishments with an invested capital of $27,562,384, using stock and materials valued at $21,673,939, and paying wages amounting to $11,162,572 to an average of 13,815 wage earners, produced rubber boots and shoes to the value of $54,098,670. Wage earners averaged $808 annually, there being about 8 males to 5 females.

Forty-three establishments with an invested capital of $44,791,412, using stock and materials valued at $31,481,177, and paying wages amounting to $7,588,584 to an average of 7,613 wage earners, produced other miscellaneous rubber goods to the value of $66,659,205. Wage earners averaged $996.79 annually, there being about 12 males to 3 females.

The total value of rubber goods exports is not stated, but nineteen establishments selling rubber products exclusive of rubber boots and shoes exported goods valued at $1,814,350.

The average number of wage earners in the rubber industry of the state shows remarkable uniformity throughout all months of the year, operatives on rubber boots and shoes averaging 287 working days, and operatives in all other lines of rubber goods 278.8 working days. Weekly salaries ranged from $5 to $35 and above. On rubber boots and shoes most male workers received from $16 to $30 or more; female, from $10 to $25; minors, from $10 to $18. In other miscellaneous lines most male workers received from $15 to $35 or above; female, from $12 to $30; minors, from $7 to $13. Of the 21,428 average rubber workers in the state, only 1,775 were under eighteen years of age.

Whereas, most of the rubber footwear is produced in or near Boston, most of the miscellaneous rubber products are manufactured elsewhere in the state. In metropolitan Boston five establishments, with an invested capital of $23,591,113, using stock and materials valued at $17,581,737, and paying wages amounting to $9,729,789 to an average of 12,075 wage earners, produced rubber boots and shoes to the value of $44,475,483. Wage earners averaged $805.78 annually, there being about 7 males to 5 females. Miscellaneous rubber goods to the value of $17,417,810 were produced by twenty-four establishments with an invested capital of $9,715,814, using stock and materials costing $7,183,310, and paying wages amounting to $2,048,186 to an average of 2,220 wage earners. Wage earners averaged $922.61 annually, there being about 8 males to 3 females.

The Hood Rubber Co., Watertown, Massachusetts, has announced that the plant will close down on Saturdays for twelve weeks during the summer months, with all operatives in the employ of the company for more than three months receiving full pay for a six-day week. Operatives with the company less than three months will receive half-pay for these Saturdays, except those who have worked less than one month, who receive no compensation. The plan takes the place of a summer shut-down and is intended to give an equivalent for Saturday half-holidays during the season of outdoor recreation in a business where half-holidays are difficult to arrange. It is on trial as an experiment this year as it was last and has not been adopted permanently.

"Multibestos Company" is the new firm name recently adopted by the stockholders of the Standard Woven Fabric Co., Walpole, Massachusetts.

The Tyrian Service Association, the recently formed employe organization of the Tyer Rubber Co., Andover, Massachusetts, held the second of a series of dances on the evening of April 6. Frederick H. Jones, treasurer and general manager of the company, was present and in a brief address expressed appreciation of the spirit of cooperation manifested. These dances are held to promote community feeling in the organization and the proceeds are used to aid and bring comfort to sick and needy employes.

The Avon Sole Co., Avon, Massachusetts, will enter the tire field shortly with a new tire developed by Everett T. Packard. The company is being reorganized and the plant will be doubled to take care of the new tire building machinery.

Everlastik, Inc., has completed a new three-story mill addition in Chelsea at a cost of approximately $75,000.

Rubber manufacturers are finding their factory papers published in the interests of employes a very potent means of promoting their Americanization work. Not only are the advantages of American citizenship made plain to foreign-born workers, but the March issue of the "Bowohoco News," for example, tells on its front page exactly how to become a naturalized citizen. Incidentally, this news sheet of the Boston Woven Hose & Rubber Co., Cambridge, not only contains the timely personal mention of the plant, but is one hundred per cent American, patriotic and common sense in its suggestion and inspiration. It is a shop paper with interest and a moral for every worker.

The Monatiquot Rubber Works Company, South Braintree, Massachusetts, is bringing an additional reclaiming unit into operation, which it is believed will increase the company's output by 20 per cent. The laboratory, also, has been enlarged and is now in charge of J. F. O'Donnell. The company has recently introduced to the trade two new products for specific uses in rubber compounds.

BOSTON NOTES.

More than 200 members of the Employment Managers' Association met at a luncheon dinner and conference on mutual benefit associations and group insurance at the Hotel Vendome, Boston, April 8. Dr. R. S. Quinby, president of the association and service manager of the Hood Rubber Co., Watertown, presided.

In his address, Dr. Quinby said that the big corporations fully realize that the health of the workers is important to the life

of the concern, and told of the health methods used at the Hood Rubber Co. plant, where some 10,000 men and women have a very small sick rate. Every new employe is given a thorough physical examination to discover defects that can be corrected. When a worker is absent, a nurse calls at his home. If he continues ill, the foreman of the department calls and, upon his report, a sick benefit is paid.

Frank A. Vanderlip, a director of the United States Rubber Co., and former president of the National City Bank of New York, will lecture on business economics at the Harvard graduate school of business administration, beginning September 1.

A conference of all the New England managers of the service department of the United States Tire Co. was held at the Hotel Thorndike, Boston, early last month. Factory representatives were present to discuss technical features of tire construction. R. R. Drake, of New York, at the head of the department, gave a talk on courtesy and business correspondence. A banquet and theatre party furnished the entertainment features.

The Firestone "Ship by Truck" movement is rapidly gaining ground in and about Boston, and despite the severe winter has proved of material assistance to the railroads, especially during the freight and express embargoes when terminals were badly congested and the shortage of freight cars was particularly acute.

It was estimated that approximately 35 per cent of the freight awaiting loading at the railway terminals during the embargoes was intended for delivery at points not more than 50 or 60 miles distant from Boston. The vast bulk of that 35 per cent was capable of being delivered by motor truck.

Aside from the efficiency of delivery, the added service which the motor truck can render, the motor express if more widely used by shippers in New England would relieve a very real burden under which the old-established systems of transportation are laboring.

More than 500 independent trucking operators are listed with the bureau, and wholesalers, manufacturers and others are learning that they may call on the bureau at any time for help in rushing cargoes to distant points or in bringing into the city merchandise and produce from manufacturers in other cities or from the farms. This service, it should be said, is given without cost and without obligation.

The annual costume party of The B. F. Goodrich Co. employes was held on the evening of April 15 at Hotel Hemenway, Boston. The affair was a most enjoyable one, with about five hundred in attendance. Prizes were awarded for the prettiest and funniest costumes. The judges were District Manager F. T. Moore, W. H. Hickey, E. E. Leach and Frank Keene.

The Campbell Motors Corporation, 715 Beacon street, Boston, has been appointed New England distributer for Stronghold tires and tubes and is appointing local dealers throughout the territory. Chester I. Campbell and A. N. Dodge will direct the sales organization.

Green & Swett, 821 Boylston street, are Boston distributers of Madison tires.

The Simplex Rubber Co., 65 Broad street, Boston, has been incorporated under the laws of Massachusetts with a capitalization of $50,000 to manufacture and distribute the Marconi heel rubber, a patent non-skid, tight edge, no-cement rubber heel. Major William F. Killip is president of the company, and William F. Donovan is secretary. The moving spirit in the organization is Gilbert F. Quinn, a man of long and varied experience in the shoe and rubber heel and sole business with the Goodyear and Firestone companies, and the Dryden Rubber Co., of Chicago, Illinois.

The Gillette Tire Co., 587 Boylston street, Boston, is a branch of the Gillette Rubber Co., Eau Claire, Wisconsin, and New York City, and has no connection with the Gillette Rubber Co., formerly at 110 Federal street, Boston, now out of business.

GENERAL MANAGER OF FIRESTONE STEEL PRODUCTS CO.

L. G. FAIRBANK, newly elected vice-president and general manager of the Firestone Steel Products Co., Akron, Ohio, brings to his office a varied business experience well fitting him for his important duties, and enabling him to view problems from the other man's standpoint as well as his own.

L. G. FAIRBANK.

Born in Cleveland, Ohio, February 27, 1886, he was educated in the West High School of that city and in 1905 entered the employ of the Struthers Furnace Co. as a stenographer. Two years later he entered the bookkeeping department and the following year was made purchasing agent.

Attracted by the rubber industry, he obtained a position in the dealers' helps department of the Diamond Rubber Co. in 1910, and two years later went to the Firestone Tire & Rubber Co. as assistant advertising manager. From that time his advancement has been rapid, even in a fast-growing organization conspicuous for constant promotion of men of merit. In 1916 he was made an eastern district manager; in 1918 eastern sales manager, and assumed his present duties the first of the present year.

Mr. Fairbank is a member of all Masonic orders, including the thirty-second degree, Knights Templar and Shrine.

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent.

THE story of rubber in Akron this year will be the expansion of the industry to the four quarters of the world. The business has grown to such proportions that it is no longer possible to confine it to the city itself.

Although approximately $10,000,000 worth of new buildings are now definitely under way, announcements have been made of branches and factories in South America and in the Orient, following the announcement that the Firestone Tire & Rubber Co. will erect a plant in Los Angeles to compete with the Goodyear Tire & Rubber Co. in its new field.

As one means of offsetting mounting costs of raw materials, particularly cotton for fabric, the Firestone Tire & Rubber Co. is sending American machinery into the Far East to replace time-consuming methods of handling crude rubber. The machinery will go into a million-dollar plant the company is erecting on the Kalang River at Singapore, Straits Settlements, the center of the world's crude rubber market. The plant will be operated by a Firestone subsidiary company—The Firestone Tire & Rubber Co. (S. S.), Limited—which was organized for the purpose.

In addition to replacing tedious manual labor with machinery, the plant will clean, condition and compress the rubber in such manner that it will occupy less space aboard ship, thereby saving on freight charges. The cleaning process, carried on by coolie-operated machines, will also effect a saving in that it will permit the rubber to go to the skilled hand of the mill operator immediately upon its arrival in Akron.

The Goodyear company recently announced the establishment of a complete rubber plant in Rio Janeiro, Brazil, primarily to take care of the rubber products business of South America, but also to prepare crude rubber for the manufacture of rubber goods in Akron. The Brazilian plant will cost approximately $1,000,000.

The Goodyear Tire & Rubber Co. is about to build a rim plant in the southern part of Akron on the Baltimore & Ohio Railroad. This move naturally follows the success of the Firestone entry into the rim and steel products business. The new factory will be a one-story brick and steel structure 250 feet wide and 660 feet long and will accommodate 500 workmen. Steel for the structure is arriving daily and a large part of the rim making machinery, for which contracts were let many months ago, has arrived on the ground. It is expected that the new rim factory will be completed about July 1, at which time the present rim department, of 600 daily capacity, will move into the new building.

The Firestone rim plant is being practically doubled and the new addition is nearly complete and ready for operation.

Akron business men and rubber manufacturers do not look upon The Goodyear Tire & Rubber Co.'s Los Angeles and Canadian projects as in any way injuring the position of Akron in the rubber world. Figures prepared by the Akron Chamber of Commerce indicate that if the rubber factories of the city do not expand in the future it will still require the city at least five years completely to catch up with its present industrial development. Much gossip has gone the rounds regarding the moving of rubber plants from Akron, but a personal interview by the writer with practically all the leaders in the rubber industry indicates that these men look upon Akron as the center from which their industries will expand. Akron, they hold, will always be the center of the industry.

For the present, at least, the housing situation in Akron has seriously handicapped the expansion of the industry here. It is estimated that the city is at least 20,000 homes short. Manufacturers hesitate to ask thousands of men to come to the city to fill their plants to 100 per cent capacity when it is practically impossible at present to bring their families and establish homes.

The Akron plan for Americanization promises to be a model for the whole country. The plan was approved at a meeting of Americanization directors at New York City recently and will probably be adopted at a national meeting to be held in Minneapolis, Minnesota, next summer. E. C. Vermillion, formerly with the Firestone Tire & Rubber Co., is now director of Americanization for the city.

Statistics prepared by the Chamber of Commerce of Akron show that Akron plants import an average of 103,374 ship tons of raw materials a year and export 58,016 ship tons. Approximately 42,120 ship tons of tires and rubber goods are exported yearly through Atlantic ports and 6,124 through Pacific ports.

The peak demand for automobile tires in the world will be 80,000,000 a year, it is stated in a report recently made public by the Akron Chamber of Commerce. The estimate includes tires for both pleasure cars and trucks. According to the same report, 45,600,000 tires are being manufactured in the United States at the present time.

At the end of the present year the demand will be 57,000,000 tires a year, it is stated. The figures are based upon the estimates of automobile and truck manufacturers that during the present year 1,600,000 pleasure cars and between 375,000 and 450,000 trucks will be turned out.

With an enrolment of 5,700, the new Goodyear Industrial University was dedicated in Akron last month. The Industrial University makes its advent into the educational world with a faculty of 117, the school's 65 class-rooms being housed in a new $2,500,000 recreational hall of the Goodyear Tire & Rubber Co. The classes, which are free, offer 33,000 employes, courses ranging from Americanization work to post graduate studies for college men and women.

The B. F. Goodrich Co., Akron, is preparing "New Goodrich Field," formerly Liberty Park, for spring athletics. It contains ten acres and improvements will cost $15,000. Athletics at the plant are under the direction of Eddie Connors.

The executive committee of the board of directors of The B. F. Goodrich Co., Akron, has announced that the employes of the company will be permitted to purchase stock of the company. Plans for a campaign to sell the stock to the employes will be announced before July 1.

A large part of the electricity used in The B. F. Goodrich Co., Akron, will be brought 100 miles from West Virginia. The power plant near Wheeling has a capacity of 120,000 kilowatts.

Among the rubber companies which have announced that they will have baseball teams in the field this spring are the Amazon, General Tire, Goodrich, Goodyear, Kelly-Springfield, Miller, Philadelphia and the Star companies.

Rubber company officials are assisting in the formation of a flying club in Akron. The membership will be made up of ex-army fliers. The government war work in aviation in Akron has given the industry a boost here upon which the fliers are depending for a great portion of their success. Commercial aerial transportation will be the main object of the new club.

The Miller Rubber Co. has announced that all unsalaried employes of the company will be given a two-weeks' vacation with pay. Salaried employes will continue to have their regular vacations with pay. If the employes recently granted vacations

EVIDENCE OF THE REMARKABLE GROWTH OF AKRON DURING THE LAST FEW YEARS IS SHOWN BY THE ACCOMPANYING PHOTOGRAPH. THE VIEW WAS TAKEN FROM THE TOP OF A 250-FOOT BRICK SMOKESTACK BEING ERECTED BY THE B. F. GOODRICH RUBBER COMPANY AND SHOWS HOW THE CITY HAS EXPANDED IN ALL DIRECTIONS TO MAINTAIN ITS PLACE AS THE RUBBER CENTER OF THE WORLD.

wish to work they will be given double pay for the period considered as their vacation.

The Goodyear Tire & Rubber Co., Akron, has purchased from the Government the Wingfoot aviation station near Akron and will continue to build and test dirigibles. The consideration paid for the station has not been made public, but it is estimated that approximately $400,000 was paid for it. Tentative plans call for establishment of a flying school for the training of airship pilots, in anticipation of the needs of airship lines in various sections of the country.

Announcement has been made that the Miller Rubber Co. will build extensions to its plant in Akron to cost approximately $861,000. Three buildings are contained in the program. Increased business made the additions necessary.

The Portage Rubber Co., Akron, has elected the following officers for the ensuing year: M. S. Long, president; J. W. Maguire, vice-president; H. M. Kerr, secretary; W. E. Wilson, treasurer, and R. J. Cole, assistant treasurer.

The McAdoo-Akron Company, Akron, was incorporated in July, 1919, and specializes in the manufacture of "Wearflex" rubberized cotton gloves in two styles, one fully rubberized and one palm-faced, reinforced with rubberized fabric. The present officers of the company are: J. S. Pattie, president; G. H. Van Hyning, vice-president; C. D. Benson, secretary; H. C. Wissman, treasurer; T. O. McAdoo, general manager, and B. E. Rockwood, assistant general manager. The directors include the above in addition to G. W. Sherman, F. H. Lahrmar, Dr. S. E. McAdoo and C. K. Strobel.

MID-WESTERN NOTES.

By Our Regular Correspondent.

EARL P. LOGAN, the new director of sales for the Kokomo Rubber Co., Kokomo, Indiana, is one of the youngest sales executives in the business. He left the banking business to take up tires. He was branch manager for the Kokomo company at Dallas, Texas, then district sales manager at St. Louis, and more recently department manager at Chicago.

EARL P. LOGAN.

The International India Rubber Corporation, South Bend, Indiana, has appointed H. C. Buchanan production superintendent. Mr. Buchanan formerly held a similar position with the Kelly-Springfield Tire Co. at Akron, Ohio.

The Akron Engineering Co., Akron, Ohio, is building a new plant for the Lynch Tire & Rubber Co., formerly of Kansas City, but now of Carthage, Missouri. The structure will be approximately 60 by 300 feet, including power house, office, etc., and tires, tubes, and other rubber products will be made.

The Hannibal Rubber Co., 305-306 Hannibal Trust Company Building, Hannibal, Missouri, has completed 80 per cent of its $150,000 modern tire and inner tube plant, and will install machinery to cost approximately the same amount. It will manufacture the "Mark Twain" tire and the "Indian Joe" inner tube, and expects to be able to market production by the autumn. A. E. Gibson is secretary.

The Nebraska Tire & Rubber Co., Omaha, Nebraska, has elected the following officers for the ensuing year: Alva Smith, president; G. C. Peironnet, vice-president; F. M. Holloway, secretary; and W. W. Wuchter, treasurer and general manager.

APRIL MEETING OF THE MID-WEST RUBBER MANUFACTURERS' ASSOCIATION.

The April meeting of the Mid-West Rubber Manufacturers' Association was held at the Chicago Athletic Association on Tuesday, April 13, and was attended by fifty members. Luncheon was served at noon, after which remarks were made by a number of those present, and many points of interest to the members of the trade were brought out.

President John T. Christie occupied the chair, and urged upon all those present the importance of extending the membership of the Association to accomplish the aims for which it was organized. He pointed out that the Association is dependent entirely upon its income from initiation fees and annual dues, and that in order to develop the organization and put it upon firm financial footing every member will have to constitute himself a special membership committee, and try to bring at least one new member to each monthly meeting. If this could be done, there would be no question about the success or the influence of the organization. He was very glad to announce that the board of directors has recommended favorable action upon the following applications for membership:

Regular Members.

Braender Rubber & Tire Co.	Rutherford, New Jersey
The Meyer Rubber Co.	Columbiana, Ohio
The India Tire & Rubber Co.	Akron, Ohio
Master Tire & Rubber Co.	Dayton, Ohio
The Cleveland Rubber Corporation Co.	Cleveland, Ohio
Fort Wayne Tire & Rubber Mfg. Co.	Fort Wayne, Indiana
Zenith Tire & Rubber Co.	Cleveland, Ohio
Iowa Cord Tire Co.	Des Moines, Iowa
The National Tire & Rubber Co.	East Palestine, Ohio
The Spreckels Savage Tire Co.	San Diego, California

Associate Members.

Bolle-Watson Co., Inc.	New York City
Bloomingdale Rubber Co.	New York City
Sessions Engineering Co.	Chicago, Illinois
General Electric Co.	Chicago, Illinois
The Herman Tire Building Machine Co.	Lancaster, Ohio
The H. B. Bixler Co.	Akron, Ohio
Meyer & Brown, Inc.	New York City
Tower Cotton Mills, Inc.	Niles, Michigan
The Banner Machine Co.	Columbiana, Ohio
Albert E. Burr Co.	New York City
J. T. Johnstone & Co., Inc.	New York City
Rubber Importers & Dealers' Co., Inc.	New York City
E. S. Kuh & Valk Co.	New York City
L. Littlejohn & Co., Inc.	New York City
Baird Rubber & Trading Co.	New York City
Brander & Curry, Inc.	New York City
Manhasset Manufacturing Co.	Providence, Rhode Island

Upon motion duly adopted the above members were unanimously elected.

Among those who spoke briefly at the meeting were: Ole Hibner, The Cleveland Rubber Corporation Co., Cleveland, Ohio; F. M. Hutchinson, Braender Rubber & Tire Co., Rutherford, New Jersey; W. F. Harrah, National-Standard Co., Niles, Michigan; H. B. Bixler, The H. B. Bixler Co., Akron, Ohio; W. H. Herman, The Herman Tire Bldg. Machine Co., Lancaster, Ohio; Harry Hunter, The Hunter Dry Kiln Co., Indianapolis, Indiana; J. C. Brown, Fort Wayne Tire & Rubber Mfg. Co., Fort Wayne, Indiana; G. G. Yule, The Falls Rubber Co., Cuyahoga Falls, Ohio; C. A. Brunner, General Electric Co., Chicago, Illinois; W. E. Lape, The Barrett Co., Chicago, Illinois; R. Paul McElrath, McElrath Tire & Rubber Co., Ravenna, Ohio.

The remarks of Edward S. Babcox, vice-president of the Akron Advertising Agency Co., Inc., in which he made some comments and suggestions in respect to the immediate future of the demand for tires were listened to with great interest.

After the general meeting of the Association the rubber manufacturers held a further session.

THE RUBBER TRADE ON THE PACIFIC COAST.

By Our Regular Correspondent.

LOS ANGELES NOTES.

MUCH OF THE SUCCESS of the young and flourishing Samson Tire & Rubber Corporation, Los Angeles, California, is due to the energetic president and general manager, Adolph Schleicher, who founded the corporation, although he modestly gives the major part of the credit to his loyal and capable coworkers. Mr. Schleicher is a graduate of Purdue University, Indiana., where he specialized in civil engineering. After building plants for the Home Telephone Co. in Indianapolis, the Columbus, Greene, and Richmond traction companies and part of the McKinley Traction Co.'s plant, he became vice-president of the Mutual Tire & Rubber Co. of New York. He is a director and was formerly president of the Monterey Land Co., and for eight years was president of the Pacific Slope Development Co. of Los Angeles. Mr. Schleicher was also president of the International Electric Co. of Delaware until that concern was merged into a larger one.

ADOLPH SCHLEICHER.

The Goodyear Tire & Rubber Co. of California is making a special effort to finish its flying field in Los Angeles. The aerodrome and its equipment is reported to be the finest in the country excepting only those built by the Federal Government. A complete hangar for dirigible airships is being added to the four airplane hangars the company already has on its 80-acre aviation field, part of a 320-acre reservation, adjoining the new plant at the old Ascot race track. The flying field has been loaned to the city and is three-quarters of a mile long by half a mile wide. It will offer every facility for airmen to land and replenish their supplies. While the airship hangar will house any heavier-than-air balloon, it will be largely used for sheltering the new 95-foot "pony blimp" which the company exhibited at the recent San Francisco aero show. The manufacture of such dirigibles on a commercial scale will soon be part of the routine of the company's work. The first "blimp" will be used for the company's dispatches between here and Phoenix, Arizona, the center of the Goodyear cotton plantations.

Nelson & Price, Los Angeles, have taken over the distribution of India tires, made by the India Tire & Rubber Co., Akron, Ohio, for southern California and New Mexico.

The Ideal Rubber Company, formerly at 203 West 50th street, Los Angeles, has removed to 5019 Moneta avenue.

A decided advantage to present and prospective tire manufacturers in Southern California is expected through the operations of the newly-formed International Commerce Corporation, which intends to establish a direct shipping service between Los Angeles and the Dutch East Indies, as well as British India, New Zealand and Australia. The concern is well financed and has already set up agencies in twenty-eight American cities to look after exports and imports.

A concern starting under favorable auspices in the tire-selling line is the newly-incorporated Guasti, House & Giulli, Inc., with handsome salesrooms at 737 Terminal street, Los Angeles. The company has contracted with the Perfection Tire & Rubber Co., Fort Madison, Iowa, for an exceptionally large order of tires, thereby securing the sole agency for California and Arizona. The officers are: Secundo Guasti, Jr., president; Elliott M. House, vice-president, and Nicola Giulli and William Dobson, treasurer and secretary, respectively.

In addition to F. A. Seiberling, president of The Goodyear Tire & Rubber Company, Akron, Ohio, three other directors of the company are in Los Angeles studying the new plant. They are: George M. Stadelman, chief of sales; F. H. Adams and H. B. Manton. The Goodyear "Flying Squadron" of 110 experts is due in Los Angeles May 15 to give the big concern a proper start. It will be headed by C. R. Langdon. C. C. Slusser, manager of the personnel department, will come to assume the factory management, while Herman Barron of the Akron organization will be California division superintendent.

F. A. Seiberling, president of the Goodyear Tire & Rubber Co., Akron, Ohio, recently spent a week in Los Angeles. He came especially to attend the convention called to urge the development, with Federal aid, of the Colorado river water power project. He also noted with much satisfaction the work being done on the company's mammoth tire plant here and was confident that actual manufacture could be started in June.

F. A. Osterloh, Jr., of the Goodyear Tire & Rubber Co. of California, Los Angeles, has just returnd from a month in Phoenix, Arizona, where he was looking after the Goodyear interests in the cotton-growing belt.

The Miller Rubber Co. of California, formerly located on Pico street, has moved to its new home at 1233 South Hope street, Los Angeles, where it is said to have one of the best-equipped tire sales and storage establishments on the Pacific coast.

The J. B. Wood Tire Co., Hewitt tire and tube distributers for southern California and Arizona, is temporarily located at 464 East Third street, Los Angeles, pending the building of its new quarters at Third street and Central avenue.

Work on the forty-acre plant of the Goodyear Textile Mills Co., adjoining the Goodyear Tire & Rubber Co.'s tire plant now in course of erection at Ascot Park, Los Angeles, is progressing so well that the company expects to operate it in July. The textile factory will run 33,000 spindles in making about 150,000 yards of cotton fabric a week, all of which will be taken under contract by the Goodyear tire concern. The latter has covenanted with the textile company to operate a plant that will turn out a minimum of 3,000 tires a day to supply the demand west of the Rockies.

The Los Angeles Horseshoe Tire Co., of which Charles Daley is manager, and which is the sole distributer for the Pacific Rubber Co. here, has moved into new quarters at 1037 South Figueroa street.

Nelson & Price, Inc., has been appointed Los Angeles distributer of the products of the India Tire & Rubber Co., and will be assisted by Bert Mooser.

SAN FRANCISCO NOTES.

Among the speakers at a dinner given by the Advertising Club at the Palace Hotel, San Francisco, recently were A. H. Kroh, Goodyear Tire & Rubber Co.; Barney Oldfield, Oldfield Tire Co.; and C. F. U. Kelly, former president, Kelly-Springfield Tire Co.

The recent big automobile show, the finest ever held in San Francisco, has resulted in greatly stimulating sales of tires and accessories. Every exhibitor reports a quickened state of trade, and all declare the sales prospects for 1920 very encouraging. There were some 80 exhibits of tires, vulvanizers and accessories.

The National Aeronautic Exposition was held in the Exposition Auditorium, San Francisco, April 21-28, 1920.

The Power Rubber Co., San Francisco, distributer of Racine tires for northern California, and of which James E. Power is the head, is erecting a new building. The company has just opened a new salesroom in Fresno, and has branches in Oakland and San José as well as a dealers' organization for other coast cities.

Thomas F. Minehan, who has been in business on Market street, San Francisco, for fourteen years, has been appointed distributer for products of the Lehigh Tire & Rubber Co.

Complete success marked the first annual Pacific Coast Automotive Equipment Exposition which was held in the Civic Auditorium, San Francisco, and which closed on the 4th of April after running a week. Over 5,000 dealers from all parts of the West had exhibits of some sort, and the big eastern concerns were also well represented. One of the striking features was a model tire repair and vulcanizing shop in charge of George Parker, who, with assistants, gave lessons day and night in tire repairing.

The West Coast Rubber Co., San Francisco, of which Charles Williamson is sales manager, has taken the agency for west of the Rockies for the Bonner inner tubes made by the Story Rubber Corporation, of New York City.

A branch of the Braender Rubber & Tire Company, Rutherford, New Jersey, has been opened at 131-133 Eighth street, San Francisco.

NORTHWESTERN NOTES.

Automobile tire dealers in the Pacific Northwest are taking a lively interest in the plans for the great motor caravan wherein delegates from the advertising clubs of that section will move to the place of their annual convention in Stockton, California, on the 23d of May. It is expected that 500 will be in the party, which, it is said, will be the largest that has ever toured over the highways of the Pacific Coast states. L. J. Sparks, manager of the Portland, Oregon, branch of the Firestone Tire & Rubber Co., will have charge of the entries in the "ship-by-truck" class. George Bellis, district manager of The Goodyear Tire & Rubber Co., also of Portland, is general chairman of the program of "stunts" to be put on at various places. The caravan will start May 17 at Vancouver, British Columbia.

The Washington Tire & Rubber Co., Spokane, Washington, which started business in May, 1919, reports gross production to December 31 as $243,806, representing an average of 51 casings and 59 tubes a day. Production is now running at close to 150 casings and 200 tubes daily, it is said; and a business of $1,200,000 is expected this year. On March 3, the following officers and trustees were elected: John B. White, president; J. L. Bowling, vice-president; H. S. Burdick, secretary-treasurer; trustees—R. B. Paterson, G. A. Laudenbach, J. W. Brett, and Fred B. Grinnell. The sales and advertising department is under the management of W. H. Heylman.

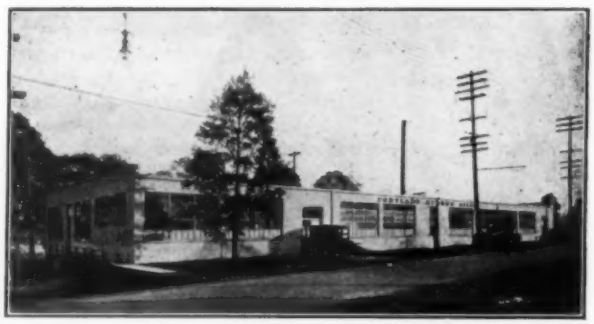
Ray & Smith, of 70 Sixth street, Portland, Oregon, have been appointed state agents for the Sterling Tire Corporation, Rutherford, New Jersey.

The United States Rubber Co.'s new location in Portland, Oregon, is at 111-115 North Sixth street, where its building 100 by 125 feet gives it approximately 75,000 square feet of floor space, of which 5,000 square feet are used for offices, sample and shipping rooms, service department, and mechanical stock. The upper floors are used as stock and storage rooms for tires, tire sundries, footwear, clothing, and druggists' sundries.

E. H. Cummings and P. J. Carson have opened a tire store at Broadway and Flanders street, Portland, and will handle Firestone products.

W. L. Powell, Broadway and Glisan street, Portland, has taken the Mulnomah County agency for Hood tires.

The Portland Rubber Mills, Portland, Oregon, were incorporated in the autumn of 1912 with a capital of $25,000, by J. Spencer Smith, H. C. Huntington and G. C. Frisbie, the capital being increased to $40,000 four years later. The factory is of concrete, 200 by 75 feet and cost $100,000. The company manufactures mechanical goods, chiefly valves, gaskets, bumpers, sheet packing, and special molded goods. It specializes in heels



PORTLAND RUBBER MILLS, PORTLAND, OREGON.

and soles, having a capacity of 10,000 pairs of heels per day, with a very large output of soles and taps. This part of the business is confined to the Western States. The company is also the northwestern representative of the Manhattan Rubber Manufacturing Co., Passaic, New Jersey, and also does an extensive jobbing business with the saw mill trade. H. C. Huntington has been president and general manager of the company from the start.

F. L. Hawley has been made sales manager for the Pacific Tire & Rubber Co., Portland distributer of Blackstone fabric and Canton cord tires. R. Jansberg and C. H. Kepler have joined the sales force.

CANADIAN NOTES.

R. Jeffers has been appointed vice-president and manager of the Firestone Tire & Rubber Company of Canada, Limited, Hamilton, Ontario.

The Bergougnan Rubber Corporation, Trenton, New Jersey, U. S. A., some months ago opened a branch at 496 Yonge street, Toronto, Ontario, in charge of William A. Shaw as manager for the Province of Ontario.

The Rubberset Company, Newark, New Jersey, U. S. A., which established a manufacturing plant in Toronto, Ontario, about four years ago, to supply the Canadian trade demand for "Rubberset" brushes, has acquired a wood-working factory at Gravenhurst, Ontario, to meet its requirements in the way of handles for various kinds of brushes. Suitable machinery will be installed and about fifty people will be employed. Any surplus production will be used in the Newark factory. The company's Canadian branch now employs about 100 people and has established general distribution of its product throughout Canada.

The Lion Tire & Rubber Co., 502 Kent Building, Toronto, Ontario, has been recently incorporated under the laws of that province to manufacture cord tires and other rubber products. A factory site of more than five acres has been purchased in New Toronto, about five miles west of Toronto, where the first factory unit will be built at an estimated cost of $500,000. It is expected that manufacturing will begin about March, 1921. The company is capitalized at $2,500,000 common stock, par value $10 per share. It has also been granted a bond issue of $750,000, but does not plan to avail itself of this at present.

William Fifield has recently taken charge of the automobile inner tube production of Ames Holden McCready Co., Montreal, Quebec.

BILLIARD ACCESSORIES OF RUBBER.

NOT CONTENT with supplying the greatest improvement ever made in billiards—the resilient ledge or elastic cushion surrounding the slate bed of the table, the one feature which has made the modern game possible—india rubber has provided devotees of the game with numerous accessories, most of which are quite indispensable. Not the least of these is the rubber-backed cloth which is largely replacing the old-time broadcloth. This cloth is now made in America and equals the best produced in Europe. It has a fine, close weave, with nap and finish to suit the most critical player, and it is made in various thicknesses to suit the different types of tables, as well as being woven to three sizes of beds. Even special care has been taken in dyeing in order to produce not only the standard blue-green color easy for the eyes under electric light, but also giving an effect that will harmonize with modern room-lighting. This material costs somewhat more than the old-fashioned billiard cloth, but this is more than offset, it is said, by its remarkably long wear. Moreover, skilful players note a decided advantage in having a slight cushion between the slate and the cloth. They say that with it shots can be made with much more accuracy than on the old, deader surface.

RUBBER CUE GRIPS.

To keep cues from slipping, the butts have been covered with cork, leather, twine, and silk and cotton braid, but players have found an excellent substitute for all these in a rubber cue grip, or sleeve, nine inches long, which will quickly transform any common cue into a perfectly non-slippable one.

RUBBER NOISE SUBDUERS.

The annoyance of cues bumping on floors is now easily overcome with rubber noise-subduers, one style being made with a nail attachment and a larger one, with an opening for a countersunk screw.

RUBBER TABLE COVERS.

Rubber-coated table covers are largely used now instead of oilcloth covers, as the paint-like coating on the latter soon cracks in handling and exposes the thin fabric through which dampness in inclement weather reaches the tightly stretched cloth on the table bed. This cloth readily absorbs moisture, offering greater resistance to the cue ball and requiring more force to drive it to an objective point.

HARD RUBBER BALLS.

Billiard balls of hard rubber are now being used instead of the more expensive ivory spheres. An infinite number of tests have proved them not only much livelier but also much more durable than the old-style composition balls.

BILLIARD MARKERS OF RUBBER.

In up-to-date billiard rooms wooden buttons suspended on a wire above the table are giving way to the neater and indestructible hard rubber markers. The latter are also used now on marker stands and frames, preferred by many to the old and often unhandy overhead counting device.

HARD RUBBER TRIANGLES.

With the passing of the old "pool room," to which more or less odium was attached, has come the "pocket billiards parlor." Here again rubber serves the players' needs in providing ebonite triangles to take the place of the maple ones so long used to arrange the fifteen balls in a pyramid. The hard rubber triangles have extra strong reinforced corners and users find they stand harder handling than the wooden contrivances.

RUBBER CEMENTS.

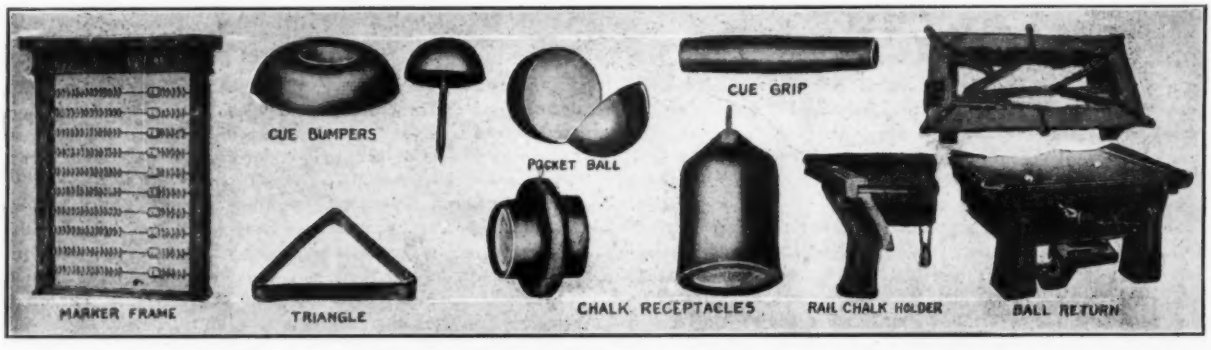
One of the least costly and most useful articles to the billiardist is rubber cement for attaching cue tips, etc. This article is put up in small tubes, and is much superior to glue preparations. Many players who want quick repairs find much satisfaction in using rubber cemented cue tips, which can be had in every size.

POCKET NET RINGS.

Pocket nets now have rubber rings instead of wood to lessen noise and ease the fall of balls. Careful players find that this simple precaution adds to the life of the balls and helps to keep them true.

RUBBER CHALK HOLDERS.

Much satisfaction is derived by knights of the cue from the rubber chalk receptacles. These holders are made in the round form only, one style being open at one end and the other open at two ends. They hang on weighted cords like other holders, either from above the table or on an under-rail frame.



HARD AND SOFT RUBBER SPECIALTIES THAT ARE INDISPENSABLE IN BILLIARDS.

FOR BALL RETURN.

Among the drawbacks of the original ball return device used beneath the table for pocket billiards were the noisy troughs or runways. Here again rubber proved to be a boon. It was placed in the troughs and all click and clatter ceased as the balls were holed and guided to the receptacle at the end of the table.

CORRUGATED MATTING.

A strong demand has developed for corrugated rubber matting beneath and around billiard tables. Not only are the looks of the table improved with such floor covering, but the firm yet elastic surface of the matting adds much to the comfort of players and lessens fatigue in long games. The ribbed matting is 1/8-inch thick and mitered at corners. It is made in nine sizes.

OTHER RUBBER SUPPLIES.

Other accessories in rubber include cushion packing facings for pocket openings in sets of twelve, tubing for cue roque table posts, and corrugated rubber mats for cuspidors.

THE RESEARCH ASSOCIATION OF THE BRITISH RUBBER TYRE Manufacturers has elected B. D. Porritt as its director.

Activities of The Rubber Association of America.

EXECUTIVE COMMITTEE TIRE MANUFACTURERS' DIVISION.

THE REGULAR APRIL MEETING of the Executive Committee of the Tire Manufacturers' Division, held in the Association rooms April 21, was well attended. Particular interest centered about the discussion of the subject of establishing minimum and maximum cross section widths for pneumatic tires, and to enable the subject to be thoroughly covered in both its commercial and technical phases, a conference had been arranged by the Executive Tire Committee with the Executive Committee of the Tire and Rim Division of the Society of Automotive Engineers. A lengthy discussion of several suggestions respecting the way in which to accomplish this end which seems to be the desire of all manufacturers, resulted in no definite recommendation and the subject was given to a special sub-committee appointed at the meeting, that will make a detailed study and report to the Tire Executive Committee at its next meeting. Several matters of a routine nature were also given attention by the Executive Committee.

MECHANICAL RUBBER GOODS SPECIFICATION COMMITTEE.

On April 2 there was held in the association rooms a meeting of the Mechanical Rubber Goods Specification Committee at which a large number of subjects connected with the negotiations of the Specification Committee with users of specification mechanical rubber goods was handled.

The work on these problems was principally of a routine nature, but definite conclusions were reached with respect to some matters, principal among which is the decision to recommend to all manufacturers of mechanical rubber goods that bids on M. C. B. air brake hose be confined to the 1913 M. C. B. Specifications as last amended by the Manual of Standard and Recommended Practice of the Master Car Builders' Association, for 1919. It is to be understood distinctly, however, that the foregoing has no application to car signal hose which may be furnished to a railroad's individual or any other specifications.

The committee felt also with respect to the matter of inspection and tests for rejection of specification mechanical rubber goods, that it should recommend to manufacturers that the period for acceptance or rejection, upon test, shall be limited to 60 days from date of shipment. In this connection it was also decided to recommend further to manufacturers, that all specification rubber goods be tested for acceptance or rejection at the point of manufacture. It is planned for the Specification Committee to hold its next meeting in Asbury Park during the week of June 22.

UNIFORM BASIS FOR COMPUTING EXTRA CHARGE FOR MAKING RUBBER BELTS ENDLESS.

Some time ago the Executive Committee of the Mechanical Rubber Goods Manufacturers' Division recommended to belting manufacturers that they adopt a uniform basis for computing the extra charge for making belts endless, which has been very generally in effect, on the following basis:

For belting under 12 inches in width, 6 additional feet.

For belting 12 inches or more in width, 8 additional feet.

Recent examination of the file on this subject indicates that acknowledgments from all interested companies approving the recommendation of the Executive Committee have been received and manufacturers have been so advised. This should insure uniform conditions in the rubber belting manufacturing business in this connection.

FUNDAMENTAL PRINCIPLES RELATING TO INDUSTRIAL RELATIONS.

New York, April 14, 1920.

To firm and affiliated members:

Please refer to our Circular Letter G-43 of March 19, announcing the distribution by the Republican National Committee, through its Advisory Committee on Policies and Platform, of a questionnaire on industrial relations and the problems of capital and labor. At that time we advised that because of the broad questions of industrial relations policy and practice involved, the Industrial Relations Executive Committee of this Association would give consideration to the specific questions set forth in the questionnaire with a view of making an analysis upon which it might predicate helpful information and suggestions to be offered to our members for consideration by them in connection with the questionnaire.

The Industrial Relations Executive Committee of the Association recently met and made an exhaustive examination and study of the questions presented in the questionnaire, and we are sending you with this letter a pamphlet entitled "Industrial Relations," in which there is set forth all of the questions contained in the Republican National Committee's questionnaire and there is shown in italics the views held by our Industrial Relations Executive Committee.

The committee wishes to be clearly understood respecting its purpose in making an analysis of the questionnaire. It desires to place particular emphasis on the fact that the political origin or purpose of the questionnaire had no place in the consideration of this matter and that it is not sent to you as an aid to political thought or action, but is intended to be non-partisan and non-political and is presented for the single purpose of offering to our members the benefit of the conclusions of experienced and practical minds in our industry who are giving all their time and energy to one of the most important problems in industry, namely, industrial relations.

The Republican National Committee's questionnaire presented questions respecting industrial relations which include nearly the whole range of fundamental principles relating to this important problem of our industrial life and had these questions originated with another political party or with other representative and responsible sources that would insure a wide distribution, our Committee would have felt that it was not meeting its duty if it did not attempt a conservative analysis for the purpose of offering assistance to the membership of this Association.

There is no doubt that each of the principles connected with the questions and suggested answers set forth in the attached pamphlet would have received attention by your Industrial Relations Committee in due course and it is perhaps fortunate that so complete an analysis of these primary principles of Industrial Relations can be made at this time in order that our members may clearly understand the viewpoint of the Industrial Relations Executive Committee which is predicated on the broad experience of its members in industrial relations work in the rubber industry.

The Committee hopes that its suggested answers to the questions set forth in the Republican National Committee's questionnaire may be of some assistance to those of our members who desire to respond to the questionnaire, but the primary purpose of distributing the attached pamphlet is to suggest to our members basic principles for conducting industrial relations work and to indicate the composite opinion of your Industrial Relations Executive Committee respecting those principles.

A. L. VILES, General Manager.

ANNOUNCEMENT BULLETIN AND INFORMATIVE SERVICE.

New York, April 22, 1920.

To firm and affiliated members:

This is the first of the bulletins which members of this Association will receive under an extension of the bulletin service heretofore conducted by this office to a limited extent through

the medium of circular letters.

Distinctive bulletin forms printed in colored inks will be used to cover the dissemination of information for the present under the following classifications:

General information,
Traffic information,
Legislative information,
Industrial relations information.
Bureau for the exchange of mill information (surplus new and second-hand material and equipment for sale and purchase).

The bulletins of each class will be numbered consecutively and will be issued as frequently as is necessary.

May we not suggest that provision be made in your office for filing these bulletins according to the classification indicated, thus building a convenient means of reference to the information emanating from the Rubber Association. An index to the numbered bulletins will be issued at frequent intervals, to expedite reference to them. A. L. VILES, General Manager.

PERSONNEL OF ASSOCIATION STAFF.

New York, April 26, 1920.

To members:

The following promotions in the staff of the Association, effective as of April 1, have been approved by the Board of Directors:

Harvey Willson, formerly assistant secretary and office manager, is promoted to the newly created position of assistant general manager.

R. H. Goebel, formerly assistant to the manager of the traffic department, is appointed manager of the traffic department.

A. L. VILES, General Manager.

NEWS TICKER SERVICE FOR THE RUBBER TRADE.

The Export and Import News Bureau, 24 Moore street, New York City, which several months ago began the operation of a foreign trade news ticker, will shortly establish a separate ticker unit devoted exclusively to the rubber trade. The Bureau will have daily cables from London, Singapore, Colombo, Batavia and other foreign markets. Consular and trade representative reports as well as other Washington news, legislative and administrative, of interest to the trade will be secured by private wire from the Bureau's Washington office. Imports at the port of New York in detail as well as steamship arrivals will be promptly bulletined.

The New York market on crude rubber of all grades, spot and future delivery, will be covered both by quotations and by bids and offers of subscribers for the ticker service. Over forty rubber dealers, brokers and importers have contracted for the service and are given the privilege of telephoning in at any time during the day to have announced on the ticker what they want to buy or sell. The subscriber does not have to use his name unless he chooses, as he can have assigned to him an office designation, as X-27 and then all replies coming to the office of the Bureau are promptly telephoned him.

The foreign exchange market will be covered very comprehensively. Continuous quotations on cable sterling will be published and twice each day, at noon and closing, the prices, never published heretofore, will be given on forward sterling by months, for nine months in the future.

An interesting feature of the Bureau's foreign quotations on crude rubber will be their translation into New York parity at the current rate of exchange. For example, if crêpe is quoted in London at 26*d.* and cables are £3.97, the announcement on the ticker would be, "London 1 p. m., crêpe, 26*d.*, New York parity 43 cents."

To serve out-of-town subscribers as well as those in New York, quotations, bids, and offers of fabrics and chemicals used by rubber manufacturers will be published. To the out-of-town subscribers the Bureau will send telegrams as often as there is any change in the market, covering both the New York quotations and foreign cables as received, and the out-of-town subscriber by using the wire can have his announcements made on the ticker as well as the New York subscriber.

THE ADVERTISING MANAGERS' COUNCIL.

More than fifty representative advertising managers of the automotive industries attended a meeting at the Hotel Commodore, New York City, March 26, 1920, under the auspices of the Motor and Accessory Manufacturers' Association, and approved plans for the organization of an advertising managers' council, as a central clearing house to handle constructive cooperative work on vital problems of mutual interest.

Among those present were: E. C. Tibbitts, advertising manager, The B. T. Goodrich Co., Akron, Ohio; M. S. Connelly, advertising manager, Hood Rubber Products Co. Watertown, Massachusetts; M. F. Judd, sales manager, R. B. Davis, district manager, and J. E. Elliott, Raybestos Co., Bridgeport, Connecticut; George B. Hendrick, publicity manager, The Fisk Rubber Co., Chicopee Falls, Massachusetts; H. B. Joseph, assistant advertising manager, and H. R. Hurd, manager copy division, Kelly-Springfield Tire Co., New York City; L. L. King, advertising manager, The Goodyear Tire & Rubber Co., Akron, Ohio, and J. C. McQuiston, advertising manager, Westinghouse Electric & Manufacturing Co., New York City.

At the luncheon which preceded the executive session of the conference, addresses were delivered by Richard H. Lee, special counsel of the Associated Advertising Clubs of the World, and David Beecroft, directing editor, Class Journal publications.

E. C. Tibbitts, advertising manager, The B. F. Goodrich Co., Akron, Ohio, pleaded for a broader vision by advertising men in meeting the complex and crucial problems facing America. It is the special privilege and duty of advertising men, he said, to render patriotic service of the most vital importance by supporting the various movements for Americanization, greater production, and better roads and transportation. He urged the advertising managers to think, not only of their own particular problems in marketing and selling their products, but also to enlist their talents and their services in the interest of the larger national movements. This can best be done, he said, through concerted action and team-work.

S. A. E. SUMMER MEETING.

The Society of Automotive Engineers will hold its summer meeting this year at Ottawa Beach on Lake Michigan, June 21 to June 25 inclusive. The Ottawa Beach Hotel and the Waukazoo Inn have been engaged for the members, and arrangements have been made for the accommodation of ladies. There will be daily lectures and business meetings, a program of sports spread over three days, and a grand ball on Thursday, June 24. Ottawa Beach is at the junction of Black Lake with Lake Michigan, six miles from Holland, Michigan, and can be reached from Chicago by boat and by train.

RUBBER GOODS BOUGHT BY THE QUARTERMASTER'S DEPARTMENT.

In the year and a half since June 1, 1918, the General Supplies Branch of the Quartermaster General's office has bought the following rubber goods:

Rubber bands, 6,696 pounds, @$1.1308 *per pound*	$7,572.50
Rubber erasers, 25,336, @ $0.02001 *each*	507.02
Rubber matting, 864 yards, @ $1.017 *per yard*	878.99
Cuspidor mats, 1,500, @ $0.245 *each*	368.75
Floor mats, 11, @ $20.5175 *each*	82.07
Treads for stairs, 90 pieces, @ $0.751 *per piece*	67.60
Finger cots, 250 dozen, @ $0.42 *per dozen*	105.00
Rubber type, 100 sets, @ $0.65 *each*	65.00
Total	$9,646.93

The Rubber Trade in Great Britain.

By Our Regular Correspondent.

BUSINESS in practically all departments of the trade continues to be brisk enough as far as the order book is concerned. This, however, does not mean that everything is proceeding smoothly and that there are no worries to contend with. In fact, if all troubles were enumerated it would form a long list, what with labor demands for higher wages and shorter hours, the rise in the price of textiles, transport difficulties, etc., to say nothing of the impending levy on war wealth. Judging by resolutions recently adopted by certain workers' unions it would seem that the day wage in most industries will be replaced by the piece-work system. This should tend to increase output, which on the day wage system usually remains at the level of the slowest worker.

This year has been remarkable for the appeal to the public to invest in all sorts of industrial concerns which, owing to the increased expense of commodities and wages, require a larger capital to carry on. To date—the middle of March—there has been an issue of about one hundred millions, of which about fourteen million pounds was for the rubber trade, including eight millions issued by the Dunlop Rubber Co., Limited. Underwriting has been easy to obtain as the public seems prepared to go in for everything which offers. This pace, however, cannot be kept up and we may expect to see a considerable slowing down.

THE PROOFING TRADE.

The use of coal tar products as petrol substitutes is on the increase, owing to the rise in price of petrol, and the solvent naphtha position is causing perturbation in the minds of proofers. So far, not much has been done in the way of installing recovery plants, but engineers are quite alive to the possibilities in this direction and a good many specifications are now before proofing firms. Of course the initial expense is now somewhat heavy and, moreover, specifications and estimates are not worth much nowadays, as they all contain clauses to the effect that extra may have to be charged if materials and labor go up before the work is completed. However, the matter of the installation of recovery plants is receiving more serious attention now than has ever been the case in the history of the proofing trade.

Now that business has got back into normal channels there is plenty of competition for the work given out and proofers are not finding it too easy to get customers to agree to the high prices now ruling on account of the increased costs of materials, except rubber. Many firms are still busy on old contracts, and where they have covered themselves for cloth they are all right and are, of course, in a very good position if they have excess cloth in stock at old prices. Those who have to buy their cloth at to-day's prices can only compete with the utmost economy in other directions, hence they do not turn a deaf ear to the advocates of naphtha recovery. The rain coat business is decidedly flat and in some cases where there is a stock of cloth rain-proofed but not cut up, it is being turned over to the proofers to be rubbered where they are found willing to take the business on.

DETERMINATION OF SUBSTITUTE IN RUBBER.

A communication on this subject has recently been published by P. Dekker, of the Netherlands Government Rubber Institute, at Delft. There will be many rubber analysts who will agree with his statement that the determination is by no means so easy as is often supposed. One cause is the incomplete abstraction of the substitute by alcoholic potash, and another is the fact that substitutes have varying composition, this being more pronounced to-day than it was ten or twenty years ago. It should be noted that the alcoholic potash extraction test, as laid down in British Government specifications, is not a process for the estimation of substitute so much as the determination of organic matter not rubber, and as the acetone extract is also taken into account it does not matter if 50 per cent of the substitute goes into the acetone extract. In the case, however, of a commercial analysis, where the object is to ascertain the amount of substitute used, the proportion soluble in acetone is of prime importance. No recognized correction can be made for this, as the amount soluble in acetone varies within such wide limits. Especially is this the case with brown substitutes containing non-oily matters, such as paraffine wax. Mr. Dekker experimented with a brown substitute containing 38 per cent soluble in acetone. In my experience the figure has varied from 15 to as high as 70 per cent, though the latter figure may be considered as exceptional.

An interesting part of the paper refers to the determination of substitute in the presence of asphalt, and it is shown that the varying amounts of asphalt dissolved by acetone and alcoholic potash entirely vitiate any attempt to gage the amount of substitute dissolved by the same solvent and the author comes to the conclusion that the determination of substitute is not feasible in rubber compounds containing asphalt. As the two are but rarely to be found in the same rubber compound, the matter is not of great importance.

The method he advocates for determining substitute in rubber is to add to the alcoholic potash extract the acetone extract minus rubber resins and sulphur, and to call the combined extract substitute. The chief draw-back to this conclusion seems to be in the fact that where paraffine wax is present it is impossible to say whether it was used in addition to the ordinary quality substitute or whether it formed a component part of the substitute. Of course, if only the fatty acid, dissolved by alcoholic potash and the fatty portion of the acetone extract are added together and returned as substitute, a correct figure is obtained for substitute as commonly understood, but not necessarily for the commercial substitute as used by the rubber manufacturer in his formula.

PEACHEY'S NEW VULCANIZATION PROCESS.

Peachey's process has been patented for most parts of the world, the British patent being No. 129,826,[1] and its exploitation is in progress by strong financial interests in England. It certainly does not lack the element of novelty as so many rubber patents do, and its advent cannot fail to excite great interest among rubber chemists and manufacturers. Stated briefly, the vulcanization is effected by sulphur without the aid of heat, and therefore certain organic fillers and a wide range of coloring matters, the use of which has hitherto been barred, may be utilized in vulcanized rubber goods. The sulphur is got into the rubber by employing the well-known inter-action of sulphureted hydrogen and sulphur dioxide gases, which leads to the formation of free sulphur. Rather surprisingly, this sulphur acts upon the rubber to vulcanize it in the cold. If a solution, say a 10 per cent solution of raw rubber in benzene, is saturated with sulphur dioxide and is then mixed with another similar solution saturated with sulphureted hydrogen, a jelly is formed after the lapse of a short time and on evaporation of the solvent the rubber is found to be well vulcanized.

[1] This patent was briefly described under "Chemical Patents" in THE INDIA RUBBER WORLD, November 1, 1919, page 86.

This is the main outline of the reaction without reference to certain details which must be attended to in order to produce a uniform rubber. The process obviously opens up a vista of possibilities in one branch or another of the rubber trade. One branch which is very much to the fore at the moment is the production of compound rubber soles for boots, and here, I am credibly informed, some very good and quite cheap material has been turned out by aid of the new vulcanizing process. Moreover, the soling material already cold cured is readily vulcanized on the boot by means of the rubber solution with the mixed gases in it, thus obviating the use of nails. There would certainly seem a wide and useful field for the process in connection with the use of organic materials such as sawdust in cheap mixings or in utilizing the process in bodies such as linoleum, where the presence of a little vulcanized rubber might well be expected to be of benefit and where the employment of the ordinary hot sulphur cure would be out of the question.

It will be interesting to watch the development of a vulcanizing process which may fairly be considered the only one which has any serious claim to consideration since the distant date of 1846 when Parkes brought out the present-day cold cure process. It is somewhat unfortunate that it seems to be the fate of cold-cure processes to be concerned with atmospheres which—well, are not in the same street with attar of roses, but still a new smell in a rubber works will not suffice in itself to destroy interest in a process which has merit behind it, and really, as far as I know, the smell vulgarly associated with election eggs may not make itself evident to the senses.

TIRES FOR TRUCKS.

A development which is attracting a good deal of attention has to do with the extended use of pneumatic tires on heavy commercial vehicles. At present from the two-ton vehicle upward the solid tire is practically the standard. There is an insistent demand, however, in many classes of traffic for freedom from road shocks, and there is also a call for less damage to the roads, and because the pneumatic tire is the best shock absorber it is felt that its upward development into the region of the heavier commercial vehicle is bound to materialize. The big pneumatic is not now entirely a novelty because it has been put to practical test in aviation, for the landing wheels of the giant airplanes used in the war. Personally I have made acquaintance with these tires only on the rubber reclaimer's premises, but it is understood that the special plant which turned them out is still in existence, although the specialized demand has ceased. Should a new demand arise in connection with commercial vehicles, no doubt the supply would soon be forthcoming. Meanwhile the number of rubber firms putting solid tires on the market continues to increase.

BRITISH RUBBER EXHIBITION—1921.

The Fifth International Exhibition of Rubber, Other Tropical Products and Allied Industries will be held at the Royal Agricultural Hall in London, June 3 to June 17, 1921. The organizing manager is H. Greville Montgomery, formerly Member of Parliament for the Bridgewater division, of Somerset, who takes the place of the lamented A. Staines Manders, the founder of these exhibitions. Sir Owen Philipps, G.C.M.G., M.P., will be honorary president and Prof. Wyndham R. Dunstan, L.L.D., F.R.S., director of the Imperial Institute, honorary vice-president; Miss D. Fulton, secretary of the late Mr. Manders, and Miss Edith Browne, F.R.G.S., are interested in the enterprise. On the Executive Committee are Dr. Joseph Torrey, who will again act as chairman of the congress; the Right Honorable Lord Leverhulme; Sir Harry Wilson; Sir Daniel Morris, D.C.L., D.Sc.; Sir Francis Watts, D.Sc., and others prominent in the rubber industries. The advisory council is drawn from officials in all tropical countries.

The offices of the organization are at 43 Essex street, Strand, London, W.C.2.

PROWODNIK REPORTED TAKEN OVER BY BRITISH CAPITAL.

In the rush to secure Russian markets British capital is anticipating peace settlements and the recognition of whatever government Russia may have, and has already invaded the new countries that have been formed from former Russian territory, Letvia, Lithuania and Esthonia. A powerful British group of capitalists is reported to have made arrangements with the authorities in these lands to handle their natural resources and industries. Among these it will reconstruct at once the works of the Prowodnik at Riga.

The Prowodnik, the full name of which is "The Prowodnik Russian-French India Rubber, Gutta Percha & Telegraph Works," was the largest rubber goods factory in Russia, and came into existence about 1889, French capital being employed. In 1916 when the German advance brought about its removal to Moscow, the company had a capital of fifty million rubles; its plant covered 3,000,000 square meters of ground; it used 20,000 horsepower in its engines; and the number of employes was 18,000. It made every kind of rubber goods, turning out 1,000 tires and 100,000 pairs of rubber shoes a day and doing 65,000,000 rubles worth of business a year.

The removal of the plant to Moscow was regarded as a wonderful feat of efficiency. Reports came at that time that the company had been nationalized, together with the other great company, the Treügolnik or Russian-American which, with it, monopolized the Russian rubber trade and, before the war, was mainly run by German capital. It is the plant abandoned in 1916 that the British capitalists are said to have taken over.

TARIFF REGULATIONS AND CHANGES.

Greece proposes to put a duty on "metallic wires covered with rubber or gutta percha," at the rate of 10 drachmas per 100 okes or 19.2 cents on 280 pounds.

Brazil imposes an export duty of 3 per cent ad valorem on rubber exported after June 1, 1920.

Latvia imposes duties of 5 per cent ad valorem on crude rubber and of 15 per cent on manufactured rubber goods.

Persia imposes duties of 12 per cent ad valorem on rubber manufactures.

Switzerland intends to exact duties of one franc on a hundred kilos of crude or waste rubber or gutta percha and of five francs per hundred kilos on threads of rubber for elastic tissue, which have heretofore been admitted free of duty.

According to the proclamation in the *"Reichsanzeiger"* of March 6, 1920, no license is required for the importation into Germany of india rubber, raw or purified; gutta percha, raw or purified; balata, raw or purified; india rubber, gutta percha and balata waste; waste wares of india rubber, gutta percha and balata.

Switzerland exacts no individual export license since February 20, 1920, for rubber and gutta percha in bands, sheets, plates, plugs, molded articles, threads, balls, rods, etc., without internal layers of metals or tissues; plates, rings, strips, etc. of rubber, with internal layers of metal or tissues.

From October 20, 1920, for gummed fabrics of rubber for industrial use, rubber fabrics for cards, cylinder covers for printing, insulating materials of rubber; rubbered fabrics (double stuffs) for cart tilts, etc.; elastic tissues of all kinds, of rubber combined with cotton, wool, silk, etc.; rubber or gutta percha applied on tissues or other materials; waterproof sheeting, rubbered on one or both sides.

On the other hand the General Export License has been abrogated for mechanical stoppers of all kinds of bottles, including those combined with rubber.

ITALY'S RUBBER INDUSTRY.

By H. C. MacLean, in "Commerce Reports."

ITALY has built up a flourishing industry in the manufacture of rubber goods, although the number of firms engaged in this line of activity is not large. The first steps toward the establishment of this industry were taken in 1872 by G. B. Pirelli, and the progress made is very creditable, considering the technical character of the industry and Italy's deficiencies in the matter of coal, gasoline, etc. There are at present in Italy 13 firms engaged in the production of rubber goods and insulated electric wire and cables, which give employment to about 20,000 persons. During the past year these firms organized the *Associazione fra gli Industriali della Gomma, Conduttori Elettrici, ed Affini*, believing that they had certain interests in common which such an association could promote.

LARGE INCREASE IN IMPORTS OF CRUDE RUBBER.

The statistics covering Italian imports of crude rubber for the past 10 years show the extent to which the rubber industry has developed. The war created an exceptional demand for rubber goods. The consumption of crude rubber in 1918 was approximately five times as great as in 1909 and more than double that of 1914, the year the war broke out.

Crude-rubber imports for the years 1909-1918, inclusive, were as follows (one lire = $0.193):

Years.			Value, Lire.	Years.			Value. Lire.
1909	*tons*	1,567	20,376,000	1914	*tons*	3,054	21,378,000
1910	"	1,878	31,960,000	1915	"	5,367	42,938,000
1911	"	2,419	30,249,000	1916	"	5,320	47,878,000
1912	"	3,494	38,438,000	1917	"	6,127	67,399,000
1913	"	2,844	25,599,000	1918	"	7,545	83,000,000

PRINCIPAL ITALIAN RUBBER GOODS MANUFACTURING COMPANY.

Italy manufactures rubber goods of practically every variety, including tires, mechanical rubber goods, hard-rubber goods, druggists' sundries and other specialties, rubberized textiles, and

WORKS OF PIRELLI & CO., MILAN, ITALY.

insulated wire and cables. The firm of Pirelli & Co., whose head office is in Milan, is by far the largest manufacturer in this line. This company has a capital of 40,000,000 lire, and, in addition to its three plants in Italy, has also additional plants in Spain, England, and Argentina. During the year 1917 its Italian production was valued at 165,000,000 lire, which was an increase of about 80 per cent over that of the preceding year. While making a wide variety of articles, the most important products of the Pirelli company are pneumatic and solid tires and electric wire and cables, in which a considerable foreign business has been built up. Its foreign establishments are engaged principally in the manufacture of electrical conductors, including submarine cables, in which line this firm has been able to compete successfully with the large manufacturers of other nations. In addition to Pirelli & Co., other establishments of considerable importance are working along similar lines.

WAR-TIME DECLINE IN EXPORTS OF RUBBER GOODS.

Italy's imports of rubber goods have remained more or less stationary for a number of years, although during the last years of the war a considerable reduction took place. On the other hand, exports steadily increased until, in 1915, they were about two and a half times greater than the imports. After Italy's entrance into the war in that year the domestic demand was such that exports were greatly reduced, in spite of the large increase in production. As conditions become normal again there is reason to expect that exports will again increase, especially in the case of pneumatic tires, as this Italian product has won considerable popularity abroad. Statistics covering Italy's total imports and exports of rubber goods for the period 1909-1918 follow:

Years.	Imports. Lire.	Exports. Lire.	Years.	Imports. Lire.	Exports. Lire.
1909.....	33,111,000	21,406,685	1914.....	27,464,000	58,106,000
1910.....	44,247,000	30,074,750	1915.....	36,460,000	87,514,000
1911.....	33,670,000	26,025,000	1916.....	33,042,000	46,944,000
1912.....	30,397,000	58,424,000	1917.....	22,281,000	23,986,000
1913.....	23,818,000	51,039,000	1918.....	19,268,000	16,322,000

IMPORTS AND EXPORTS OF RUBBER GOODS FOR FIRST SIX MONTHS OF 1919.

From the figures for the first six months of 1919 an idea can be gained of the character of the rubber and rubber goods imported and exported by Italy. Unfortunately, the largest increase in imports is shown in the case of "other rubber products not specified," and there is no means of ascertaining what commodities are included under that head. On the side of exports, the most important item is pneumatic tires, where the 1919 figures are more than double those of the previous year, and exceed imports by about 4,000,000 lire. Statistics covering insulated wire are not available. The detailed figures of imports and exports of rubber and rubber goods for the first six months of 1919 are given below:

Articles.	Imports. Quantity.	Imports. Lire.	Exports. Quantity.	Exports. Lire.
Rubber and gutta percha, crude and reclaimed ..... *tons*	7,048	67,274,550	362	1,316,800
Scrap	944	1,545,120	11	12,000
Rubber and gutta percha in:				
Threads	16	395,200	13	486,000
Sheets	10	161,600	5	93,000
Tubes	9	115,100	53	521,000
Belting	27	454,400	10	152,000
Rubberized textiles in the piece....	37	88,500	10	117,600
Rubber shoes	1,427	194,700	....	.....
Elastic webbing	27	691,600	33	1,089,000
Garments and traveling equipment, *pounds*	440	6,400	880	19,200
Manufactures of rubber:				
Rubber sheets ....*tons*	2	53,200	5	130,000
Rubberized textiles	228	3,536,000	10	158,400
Pneumatic tires	331	7,663,200	667	11,534,900
Rubber goods not specified.....	870	11,866,500	87	1,107,400

CHICLE IMPORTS FOR 1919.

The import trade in chicle increased greatly in quantity as well as value in the first year of peace, according to Commerce Reports. Mexico, the chief source, shows a gain in quantity of 1,891,307 pounds in 1919 over 1918 and in value of $1,791,107, while the other chicle countries show smaller gains. The average value per pound rose from 37 cents in 1914 to 65.8 cents in 1919, about 78 per cent in six years. The increase from the 52.6 cents per pound of 1918 was 25 per cent. The average import prices paid per pound in 1919, by countries, were: Canada $1.24, British Honduras $0.675, Mexico $0.74, Colombia $0.321, and Venezuela $0.285.

SUBSTITUTE FOR CHICLE.

The latex of the *Galactodendron utile*, a tree of Colombia, was examined by M. T. Dawe, of the London Imperial Institute, who found, after drying it, that it contained 90.8 per cent resin, 3.1 per cent impurities and 6.1 per cent gutta. The last was very soft and plastic. The substance is too friable and resinous to be used as balata or gutta percha are, but it strongly resembles pontianak. The latex differs from chicle because it contains more resin and less gutta, but it could easily be used for chewing gum, as it is pale in color, is free from bark and mineral matter, and becomes more plastic when it is chewed.

Rubber Plantations in Kamerun.

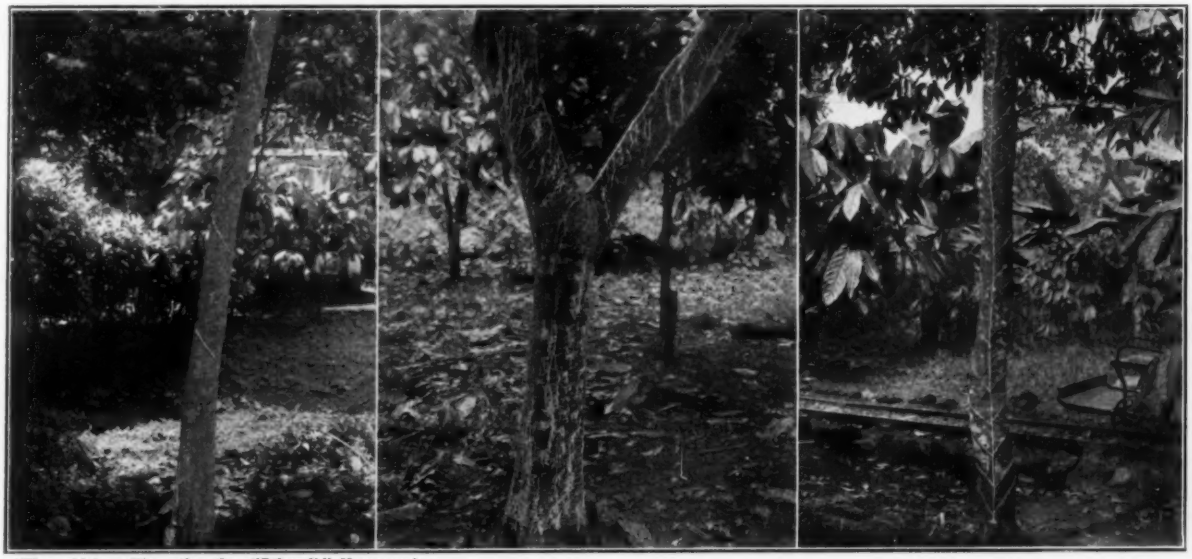
By Alfred Dominikus.

IT CANNOT BE DENIED that the Germans, in so far as conditions permitted, did their best to further the cultivation of rubber in their former African colonies which were taken away from them by the war, but that on the other hand, many disastrous mistakes and errors were made which prevented the expected successful results from the work. Consider for example, former German East Africa. Since the ground was not suitable for *Hevea brasiliensis*, the Ceara rubber tree (*Manihot glaziovii*) was cultivated in this district, but it cannot be said to-day that there was any special success in the cultivation which some years ago was stigmatized scientifically as a distinct mistake.

The English, who are masters of the colony they now call Tanganyika—that is to say, English companies such as East African Plantations, Lewa Rubber Estates, Kamna Rubber Estate, and the Muhesa Rubber Plantations—at the time of the rubber boom, with its deep shadows, took over the best *Manihot* plantations of what was then German East Africa without obtaining any better results.

A still more manifest failure can be recorded regarding the *Kickxia* (*Funtumia elastica*) plantations in Kamerun. When Dr. Schlechter, on the basis of the results from his West African rubber tree (1899-1900), praised the agricultural value of the *Kickxia* in the highest terms, designated the cultivation of this species as "extraordinarily profitable" and recommended it, especially for West Africa, "since it is native to the country, and therefore surely seems to offer better prospects for success than the various rubber trees of other portions of the world," it naturally resulted that the work of cultivating the native African rubber tree should be eagerly taken up in former German Kamerun. Dr. Schlechter had stated that a tree seven years old had given 3,400 cubic centimeters of latex, out of which 2,000 grams of rubber were obtained; also that trees not yet six years old had yielded 140 to 170 grams of dry rubber, from which he inferred that the trees could be tapped four times a year, and perhaps even more frequently with similar results. It was said in the prospectus for a plantation scheme, that *Kickxias* about fifteen years old gave on the average in the course of three years seven pounds of rubber per tree and per year. And what were the results of this Kamerun *Kickxia* fever?"

Information on this is given in an article by Heinrich Picht in the "*Tropenpflanzer*" for January and February, 1920, on the prospects of profits from some Kamerun plantations. As remarked above, and as Picht states in the introduction to his article, the *Kickxia* cultivation in Kamerun was taken up at the time with great hopes. From the quality of the rubber obtained and the reports of professed scientific men on the results, these hopes seemed to be thoroughly justified. Yet hardly any such tropical culture has brought on the bitter disillusions that *Kickxia* has! The author gives proof of this plainly from more definite statements of the results of tapping, which he caused to be made and could verify in part. The figures reported by Picht are given in the following table:



(*West African Plantation Co., "Bibundi," Kamerun.*)

FIVE-YEAR HEVEA BRASILIENSIS. MANIHOT GLAZIOVII. SIX AND ONE-HALF-YEAR KICKXIA.

No.	Year.	Age of Trees. Years.	Total Number of Tappings.	Total Yield of Dry Rubber. Kilos.	Rubber Yield Per Tree and Tapping. Grams.	Rubber Yield Per Tree and Year. Grams.	Per Cent of Latex to Dry Rubber.
1	1911	5-7	214,298 (about half of the trees 2 x tapped)	16,929	7.9	11.7	30.0
2	1912	6-8	353,350 (part of trees 3 x tapped)	2,827	8.0	..	28.9
3	1913	6-10	194,755 (part of trees 3 x tapped)	1,316	6.7	21.1	22.6

Picht unfortunately can not give a reliable scale of crops; yet tree production increasing from the sixth to the tenth year from 10 to 50 grams seems to him attainable. When Preuss puts the yearly yield of a six-year *Kickxia* at 50 to 60 grams, that of a 15-year tree at 500 grams of rubber, his statements find as little support in the results reported in the article before us, as do the assumption of Schulte im Hofe that a tree with a trunk circumference of 50 to 55 centimeters will yield about 100 grams, or the crop estimates of the English investigator Christy, who assumes that the yield of five to ten-year trees increases from 85.2 to 426 grams.

At all events Picht believes, on the basis of his experiences

before the war, that it is useless to speak of profitable results from *Kickxia* in a tropical agricultural sense, but that at best we can consider only the value of the individual trees, which can be realized only on their being tapped to death, but which in comparison with the clearing necessary to open up a new form of cultivation amounts practically to nothing. This led one Kamerun planter in an excess of rage to set fire to his whole *Kickxia* possessions.

Thus, to use Picht's words, *Kickxia* was the most unpleasant chapter in the history of Kamerun plantation, and it must be looked upon as a great piece of good fortune that the amount of capital invested in this cultivation is comparatively small and that the estates, which at first turned extensively to *Kickxia*, for the most part were diverted at the right time to other cultures, so that the *Kickxia* portion in them sank to the rank of an unimportant side culture. Moreover, we should mention here what Picht does not state, that at the beginning great plots of *Kickxia* were planted which did not belong to the species *K. elastica*, but were obtained from specimens of the wholly valueless species *K. africana*, as was only discovered later.

In another article (*"Tropenpflanzer,"* January, 1920), Picht treats of the prospects of profits from the *Hevea brasiliensis* in Kamerun and forms a wholly different judgment. In view of the amazing profits obtained from the rubber plantations of Eastern Asia and of the increasing lack of confidence in the results of the *Kickxia*, the Kamerun planters turned to the cultivation of *Hevea*. After they had succeeded in obtaining *Hevea* stumps in large quantities from Eastern Asia and transporting them to West Africa, there was no difficulty in raising this tree, especially as the ground and the rainfall conditions in Kamerun were in every way favorable.

At the outbreak of the war large *Hevea* plots in Kamerun had reached an age that permitted tapping. Picht, who made a journey to Ceylon and the Straits Settlements in 1910-1911, was in a position to make comparisons between the growth of the *Hevea* there and in Kamerun. He was unable to see any difference. Later he was able, on the basis of experiments which were made on the plantations under his care, to give figures which allow safe inferences to be drawn on the profitable character of *Hevea* cultivation in Kamerun. He prints a table taken from the "Straits Times" on the average yield of *Hevea* of various ages, and then gives more detailed accounts of what the Kamerun *Hevea* yielded in comparison. The results of the figures follow:

No.	Age of Heveas. Years.	Number of Tappings (Renewed Cuts) Per Tree.	Rubber Yield Per Tree. Kilos.	Straits Figures for Comparison. Kilos.
1	6	205	1.16	0.725
2	5	125	0.5	0.35

The yields in Kamerun are, therefore, substantially greater than in the Straits, which is the consequence probably of the richer soil in Kamerun and the better rainfall condition there. It should be mentioned also that the above tappings were made with an extremely careful regard for the bark, such as has gradually been shown to be the best thing in Asia. *Hevea* in Kamerun is generally planted mixed with cacao—about 180 *Hevea* and 542 cacao trees to a hectare.

Picht presents more detailed estimates of profits and comes to the conclusion that in Kamerun, whose negroes have shown themselves to be an industrious and relatively cheap form of labor, *Hevea* cultivation should profit by the expensive experience gained in other countries, with results no less successful than in East Asia.

AFRICAN NOTES.

From the Gold Coast of Africa comes an interesting report of the Agricultural Department for 1918, which shows a steady purpose of building up again the rubber trade under discouraging circumstances. Less than ten years ago West Africa was exporting over 14,000 tons of rubber and seemed to have an even chance with the plantations of the Far East. The government keeps up nine agricultural stations which report on rubber cultivation. Those at Tarquah and Cormassie have 78 and 60 acres, respectively, devoted to rubber; the others are much smaller. On all, elaborate experiments are being made in tapping, in planting, in the distance from each other of the trees, and the diseases which seem to be unduly prevalent, are studied. Small farms, planted with rubber, are prepared for the natives, who cannot be made to take an interest in them; the white planters, too, care little for rubber.

The cause of the depression is ascribed to the war, but it is more likely due to the hopelessness of contending with the triumphant Asiatic plantation rubber. Still the statistics demonstrate that on the Gold Coast and in the surrounding territory the physical conditions for growing *Hevea* rubber, as well as that of the indigenous *Funtumia elastica* are very favorable, if the proper supply of labor can be obtained, and that England can fall back on these possessions for her rubber supply in case any political or other disaster were to deprive her of her East Indian and Malayan territories.

Exports from French West Africa, of which rubber forms an important part, were interfered with on account of the deficiency of vessels in the period following the armistice. The figures were:

	Pounds.	Value.
French Guinea	1,559,800	$683,730
Ivory Coast	547,800	240,406
Senegal	719,400	315,994
Totals	2,827,000	$1,240,120

In 1917, French West Africa exported 2,873,200 pounds of rubber, valued at $1,260,396. Only $5,734 worth of rubber from the Ivory Coast went directly to the United States.

SINGAPORE GUTTA PERCHA EXPORTS.

As an example of the upward tendency in the prices asked for gutta percha, it may be stated that "Pahang red," which five years ago cost approximately $158 per picul (133 1-3 pounds), rose to $312 at the close of 1919, with supplies even at this price practically unobtainable. Similarly, "Banjirmassin" increased from $85 to $142 during the same period, and this may be taken as a fair average of the advances made on all grades of gutta percha during the past five years. It will thus be seen that increases of 80 to 100 per cent have taken place.

Gutta percha to the amount of 1,469 long tons, valued at $1,468,792, was imported into Singapore during the year 1918. Of this amount 1,372 tons, at a value of $1,358,764, were imported from the Dutch East Indies, while only 91 tons, valued at $107,431, were imported from British North Borneo, Sarawak, and the Federated Malay States.

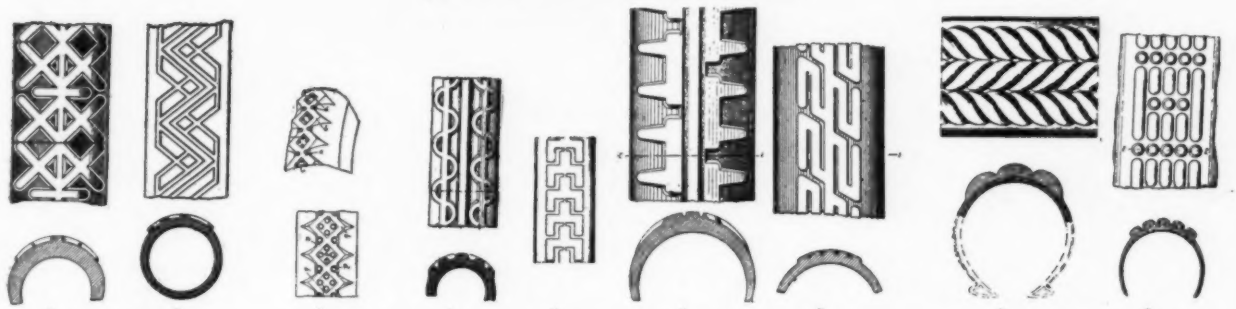
Of gutta inferior, 5,243 tons, valued at $518,975, were imported into Singapore during the year 1918, most of which came from Dutch Borneo and Sarawak, Sumatra furnishing only 300 tons.

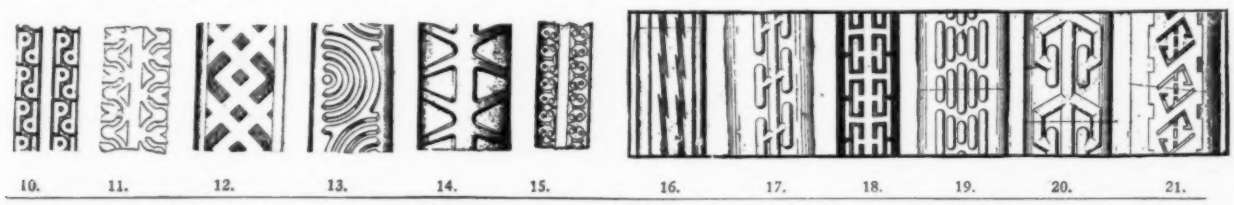
The following table shows the quantities, values, and countries of destination of gutta percha and gutta inferior exported from Singapore during 1918:

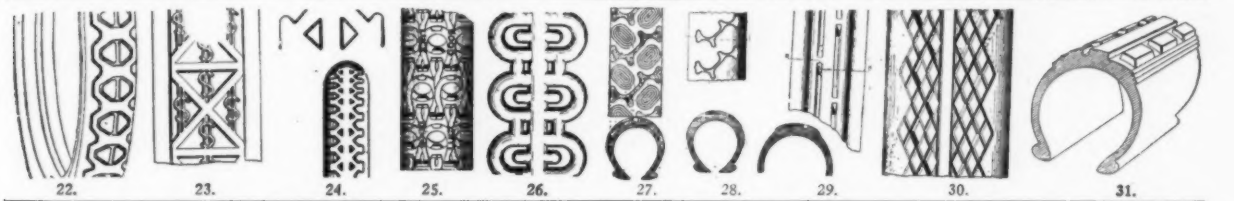
Countries of destination	Quantity	Value
GUTTA PERCHA.		
United Kingdom ..... *tons*	1,596	$1,556,357
Canada	138	44,895
France	113	43,909
Italy	30	11,447
Japan	33	22,755
United States	1,230	362,736
Totals	3,140	$2,042,099
GUTTA INFERIOR.		
United Kingdom	99	9,539
Canada	71	6,365
Australia	17	1,797
Other British possessions	1	42
France	10	1,022
Japan	144	16,009
United States	834	89,959
Other foreign countries	2	227
Totals	1,178	$124,960

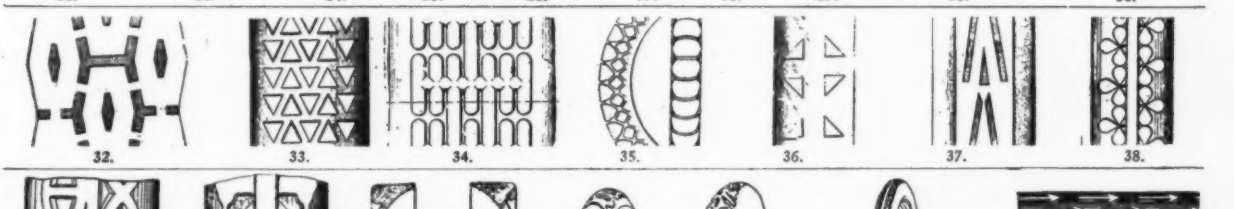
Pneumatic Tire Tread Designs.

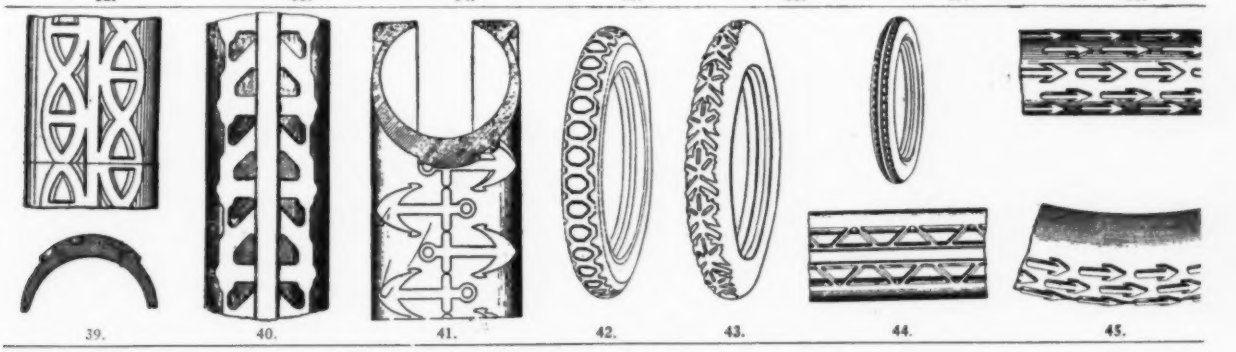
DECEMBER, 1916, TO SEPTEMBER, 1917.











Cut. No.	Patent. No.	Patentee or Assignee and Address.
(1).	49,754.	E. P. Altenberg, East Palestine, Ohio.
(2).	49,785.	The B. F. Goodrich Co., New York City.
(3).	49,792.	G. W. Beldam, Ealing, England.
(4).	49,811.	C. A. Westover, Youngstown, Ohio.
(5).	49,836.	The Sebring Tire & Rubber Co., Sebring, Ohio.
(6).	49,877.	The Victor Rubber Co., Springfield, Ohio.
(7).	49,901.	The Amazon Tire & Rubber Co., Akron, Ohio.
(8).	49,947.	S. J. Bogan, Torrance, California.
(9).	49,969.	The B. F. Goodrich Co., New York City.
(10).	50,567.	J. D. Kline and C. A. Barnholth, Akron, Ohio.
(11).	50,644.	H. S. Blynt, Binghamton, New York.
(12).	50,655.	G. P. Herrick, New York City.
(13).	50,673.	S. S. Adams, Lafayette, Tennessee.
(14).	50,681.	United & Globe Rubber Mfg. Cos., Trenton, New Jersey.
(15).	50,769.	E. Von Vargyas and J. J. Vavora, Binghamton, New York.
(16).	50,931.	J. M. Gilbert, New York City.
(17).	50,956.	The B. F. Goodrich Co., New York City.
(18).	50,961.	Racine Rubber Co., Racine, Wisconsin.
(19).	50,976.	The B. F. Goodrich Co., New York City.
(20).	50,977.	The B. F. Goodrich Co., New York City.
(21).	51,013.	F. T. Faircloth, San Francisco, California.
(22).	50,352.	R. H. Keaton, San Francisco, California.
(23).	50,360.	C. B. Reynolds, Sawtelle, California.
(24).	50,361.	W. A. Robbins, Glen Ridge, New Jersey.
(25).	50,380.	W. D. Freese, Akron, Ohio.
(26).	50,431.	The Norwalk Tire & Rubber Co., Norwalk, Connecticut.
(27).	50,120.	W. B. Buckley, New York City.
(28).	50,121.	W. B. Buckley, New York City.
(29).	50,134.	R. H. Keaton, San Francisco, California.
(30).	50,190.	Hood Rubber Co., Watertown, Massachusetts.
(31).	50,202.	E. Hopkinson, New York City.
(32).	50,793.	M. F. Oliver, Berkeley, California.
(33).	50,840.	I. C. Kocontes, River Forest, Illinois.
(34).	50,915.	The B. F. Goodrich Co., New York City.
(35).	50,873.	E. A. Jones, Los Angeles, California.
(36).	50,828.	W. B. Buckley, New York City.
(37).	50,871.	F. T. Faircloth, San Francisco, California.
(38).	50,881.	E. Von Vargyas, Washington, D. C.
(39).	50,265.	The Lancaster Tire & Rubber Co., Lancaster, Ohio.
(40).	50,269.	P. De Mattia and B. De Mattia, Clifton, New Jersey.
(41).	50,282.	G. W. Odell, South Bend, Indiana.
(42).	49,927.	R. H. Keaton, San Francisco, California.
(43).	49,958.	O. W. Dunham and F. W. Willis, Toronto, Ontario, Canada.
(44).	49,953.	W. R. Denman, Akron, Ohio.
(45).	49,952.	G. Crowley, Hartford, Connecticut.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED MARCH 16, 1920.

NO. 1,333,630. Demountable rim for tires. J. E. Rhodes, Dallas, Texas.
1,333,673. Crate for automobile wheels or rims. O. A. Parker, Cleveland, Ohio.
1,333,674. Automobile wheel with pneumatic tires. O. A. Parker, Cleveland, Ohio.
1,333,679. Demountable rim for tires. H. D. Rey, Avarua, Raratonga Island, Cook Islands, New Zealand.
1,333,680. Demountable rim for tires. H. D. Rey, Avarua, Raratonga Island, Cook Islands, New Zealand.
1,333,748. Demountable rim for tires. J. M. Berry, Detroit, Mich.
1,333,779. Automobile tire. W. W. Robinson, East Liverpool, Ohio.
1,333,791. Hose coupling. O. C. Brandt, St. Paul, Minn.
1,333,915. Tire shoe and rim. S. E. Hall, assignor of one-half to W. G. Moser—both of Akron, Ohio.
1,333,928. Cushion wheel construction with dual solid tires. W. C. Martin, assignor to Morand Bros.-Martin Cushion Wheel Co.—both of Chicago, Ill.
1,333,929. Cushion wheel construction with single solid tire. W. C. Martin, assignor to Morand Bros.-Martin Cushion Wheel Co.—both of Chicago, Ill. (See THE INDIA RUBBER WORLD, November 1, 1919, page 88).
1,333,961. Dilator. C. O. Burgess, Monmouth, Ill.
1,333,983. Resilient heel lift. F. Kish, Elyria, Ohio.
1,334,011. Automobile wheel with pneumatic tires. E. K. Baker, assignor to Baker Wheel & Rim Co.—both of Chicago, Ill.
1,334,067. Cushion tire. W. A. Anglemyer, Indianapolis, Ind.
1,334,110. Reinforced pneumatic tire. D. Moriarty, Oakland, Calif.
1,334,171. Blow-out patch. C. A. Russell, Jr., Orange, Texas.
1,334,176. Indoor golf game. W. H. Seagrave, Cleveland, Ohio.
1,334,204. Air cushion tire. H. S. Williams, assignor of one-half to O. Keller—both of San Antonio, Texas.
1,334,205. Cushion tire. H. S. Williams, assignor of one-half to O. Keller—both of San Antonio, Texas.
1,334,210. Rubber heel or lift. J. T. Ashton, assignor of one-half to E. C. Heilhecker—both of Bristol, R. I.
1,334,237. Surgical device with pneumatic cushion. H. Fleck, Oklahoma, Okla.

ISSUED MARCH 23, 1920.

1,334,378. Hot-water bottle. H. E. Kaufman, West Brighton, N. Y.
1,334,438. Rubber horseshoe reinforced by metal insert. E. G. Crump, assignor to Perfection Rubber-Metal Horseshoe Co.—both of Akron, Ohio.
1,334,448. Inflatable tire. W. P. Gordon, assignor of one-half to T. B. Jacocks—both of Tarboro, N. C.
1,334,493. Demountable wheel tire. W. H. Holahan, assignor to Hol-Mor Wheel Co.—both of San Francisco, Calif.
1,334,514. Diaper supporter. M. J. Beitter, Nogal, N. M.
1,334,635. Grommet or tire-bead and method of making them. A. C. Pratt, Deep River, Conn.
1,334,793. Tank ball of rubber and rubber composition. C. Riegger, New York City.

ISSUED MARCH 30, 1920.

1,335,115. Tire filler. O. L. Huffman, Weatherford, Texas.
1,335,245. Cushion spring wheel. W. W. Krutsch, Coffeyville, Kans. assignor of one-half to W. M. Harrison, Muskogee, Okla.
1,335,268. Pneumatic tire and rim. A. L. Baker, Jerome, Mich.
1,335,273. Rubber shoe. A. M. Bruce, Ira, Mo.
1,335,341. Fountain pen. H. J. Jorgensen, Jersey City, N. J.
1,335,411. Tire-shoe and rim. J. H. Wagenhorst, Akron, Ohio.
1,335,442. Pneumatic tire. W. Kline, Mogadore, assignor to The Interlocking Cord Tire & Belt Co., Akron—both in Ohio.
1,335,467. Closure for water bottles, etc. J. C. Traynor, Buffalo, N. Y.
1,335,469. Pneumatic tire. R. R. Vale, Milford, Del.
1,335,496. Link cushion tire. M. Hamburger, Baltimore, Md.
1,335,505. Raincoat. P. O. Huntington, Brighton, assignor to H. M. Sawyer & Sons, Cambridge—both in Massachusetts.
1,335,710. Multiple-tread pneumatic tire. A. Jakovleff, assignor to Jak Tire Corp.—both of San Francisco, California.
1,335,711. Dual sectional pneumatic tire. A. Jakovleff, assignor to Jak Tire Corp.—both of San Francisco, Cal.
1,335,712. Sectional pneumatic tire. A. Jakovleff, assignor to Jak Tire Corp.—both of San Francisco, Cal.
1,335,713. Vehicle tire. A. Jakovleff, assignor to Jak Tire Corp.—both of San Francisco, Cal.

REISSUES.

14,832. Tennis ball. A. T. Saunders, Chicopee, Mass., assignor to A. G. Spaulding & Bros., Jersey City, N. J. (Original No. 1,287,766, dated December 17, 1918.)

ISSUED APRIL 6, 1920.

1,335,778. Demountable rim for tires. O. Abbadini, Fairbanks, Pa.
1,335,820. Resilient tire. F. C. Cave, Des Moines, Iowa.
1,335,840. Water-carrying attachment for safety razors, similar to ink sack in fountain pens. J. F. Kaylor, Pekin, Ill.
1,335,861. Dust cap for protecting automobile tire valves. J. Shaw, St. Louis, Mo.
1,335,916. Pneumatic tire. A. M. Poynter, London, England.
1,335,920. Dust proof and moth proof wardrobe with elastic tube in molding around opening. J. Rockett, Cleveland, Ohio.
1,335,976. Valve for inner-tube valve stems. V. A. Leach, San Francisco, Calif.
1,336,023. Combined valve cap and dust cap. A. B. Catterall, Ottumwa, Iowa.
1,336,139. Automobile tire. L. Hofmeister, Milwaukee, Wis.
1,336,173. Inner tube for pneumatic tires. J. J. Voorhees, Jr., Jersey City, N. J., assignor by mesne assignments to United States Compression Inner Tube Co., Tulsa, Okla.
1,336,310. Siphon starter. A. H. Marhenke, New York, N. Y.
1,336,348. Pneumatic tire with separate air chambers. E. G. Fido, Bombay, India.

THE DOMINION OF CANADA.

ISSUED MARCH 2, 1920.

197,600. Sole and heel of boots and shoes. G. W. Beldam, Ealing, and A. U. Benjamin, Brentford, coinventors—both in Middlesex, England.
197,609. Shoe for pneumatic tires. L. F. Bacon, Estelene, Colorado, U. S. A.
197,632. Sponge rubber cushion tire. T. W. Costello, San Francisco, California, U. S. A.
197,647. Sectional tire. E. W. Edwards, Akron, Ohio, U. S. A.
197,666. Stamp and envelope moistener. W. Hegland, Plentywood, Montana, U. S. A.
197,667. Inner tire. H. M. Henning, Hinkley, California, U. S. A.
197,674. Pneumatic tire with tread of metal sheathing. C. R. Irvine, Sarnia, Ontario, Canada.
197,685. Tire tread. J. Laube, Deer Island, Oregon, U. S. A.
197,687. Reinforced tire. H. J. Lomer, Detroit, Michigan, U. S. A.
197,720. Pneumatic tire filled with small cells self-inflated when air is admitted to tube containing them. W. H. Richards, Knoxville, Tennessee, U. S. A.
197,733. Reinforced rubber and spring tire. A. F. Stockwell, Los Angeles, California, U. S. A.
197,742. Pneumatic tire. P. E. van Berendonck, Amsterdam, The Netherlands.
197,755. Rubber retainer. P. J. Young, Santa Susana, California, U. S. A.
197,801. Sanitary baby pants. The I. B. Kleinert Rubber Co., assignee of G. K. Guinzburg—both of New York City, U. S. A. (See THE INDIA RUBBER WORLD, December 1, 1919, page 157.)
197,832. Pneumatic tire. P. P. White, assignor of a half interest to A. Brooks—both of Wellington, New Zealand.

ISSUED MARCH 9, 1920.

197,875. Hose supporter. S. A. Glynn, W. H. Wolpert and Chas. J. Hanzel, coinventors—all of Antigo, Wisconsin, U. S. A.
197,891. Transversely split demountable rim for tires. W. N. Booth, Detroit, Mich, U. S. A.
197,916. Demountable rim for tires. R. R. Craft, Norfolk, Nebraska, U. S. A.
197,952. Two-part rim for tires. B. F. C. Haanel, Ottawa, Ontario, Canada.
198,036. Rubber sole. A. Santacroce, Elyria, Ohio, U. S. A.
198,056. Demountable rim for tires. J. Walker, Canonsburg, Pa., U. S. A.
198,075. Hose coupling. The Canadian Consolidated Rubber Co., Limited, Montreal, Canada, assignee of A. J. Brown, Union Hill, New Jersey, and A. A. Somerville, New York City, New York—both in U. S. A.
198,088. Demountable rim for tires. The Hayden Manufacturing Co., assignee of W. A. Hayden—both of Minneapolis, Minn., U. S. A.
198,091. Cushion tire. The K., F. & C. Tire & Rubber Corp., assignee of F. A. Krusemark, L. G. Funkhouser and H. G. Carpenter, all of Roanoke, Virginia, U. S. A. (See THE INDIA RUBBER WORLD, August 1, 1918, page 666.)
198,112. Demountable rim for tires. The Two-Part Rim Co., assignee of C. L. Peters and A. L. Johnson—all of Worcester, Massachusetts, U. S. A.

ISSUED MARCH 16, 1920.

198,146. Inner tire protector. C. A. Stuart and G. E. Stuart, coinventors—both of Oregon City, Oregon, U. S. A.
198,165. Inner tube for automobile tires. G. C. Berryman, Los Angeles, California.
198,257. Inner tube for tires. T. L. Morton, New Orleans, Louisiana, U. S. A.
198,266. Spring tire. J. L. Ogden, Chicago, Ill., U. S. A.
198,312. Hose coupling. W. L. Walker, New York City, U. S. A.
198,365. Tire. D. S. Myers, St. Louis, Missouri, and S. Johnstone, Buffalo, New York, assignee of a half interest—both in U. S. A.

ISSUED MARCH 23, 1920.

198,396. Cushioned wheel hub. J. Bogdon and J. Mitrosky, coinventors—both of Perth Amboy, New Jersey, U. S. A.
198,510. Pneumatic seat support for motorcycles. H. Seibel, San Francisco, California, U. S. A.
198,511. Pneumatic seat support for motorcycles. H. Seibel, San Francisco, California, U. S. A.
198,512. Pneumatic seat support for motorcycles. H. Seibel, San Francisco, California, U. S. A.
198,557. Footwear of rubber, rubber compound and fiber. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada, assignee of C. J. Randall, Naugatuck, Connecticut, U. S. A.
198,588. Brassière with elastic waist section. The Treo Co., Inc., assignee of M. W. Schloss—both of New York City, U. S. A.
198,597. Friction shoe. E. F. Nanfeldt, New Haven, Connecticut, and E. O. Christiansen, assignee of a fourth interest, Walpole, Massachusetts—both in U. S. A.

ISSUED MARCH 30, 1920.

198,751. Rubber heel. A. Santacroce, Elyria, Ohio, U. S. A.

THE UNITED KINGDOM.

ISSUED MARCH 10, 1920.

137,465. Modified scarf as head covering, of rubberized or other material. S. E. Smith, Dunkirk Crescent, Halifax, and A. Pearson, Corn Exchange Building, Manchester.
137,469. Device for attaching revoluble rubber heels. W. Plowright, 18, Palmerston avenue, Whalley Range, Manchester.

ISSUED MARCH 17, 1920.

137,709. Studs or bars for foot-ball and like boots, composed of layers of leather and rubber. R. T. Richardson, Victoria Road, Northampton.

Chemical Patents will be found on page 497. Machinery Patents on page 502.

137,729. Detachable rubber pad for heels. A. J. Maidlow, 11 Lakefield Road, Westbury avenue, Wood Green, London.
137,766. Tire reinforcing shoe of rubber vulcanized to steel band, secured to pneumatic tires by inflation. F. Lee-Deeks, 6 Broomfield Road, Cheimsford, Essex.
137,812. Aluminum shell heel for ladies' boots, recessed to receive conical plug of leather, rubber, etc. D. H. Finberg, 210 Washington avenue, St. Louis, Missouri, U. S. A.

ISSUED MARCH 24, 1920.

137,886. Weighing device for cyclists' skirts, padded with rubber. F. D. Henman, 25 Kendrick Road, Reading.
137,902. Respirator for aviators, etc. E. Martin, 30 Oxford Road, Putney, and W. Neuis, 3 London Wall Buildings—both in London.
137,921. Neck-ties with lining covered with gutta percha. F. W. Clarke, 31 Gower Road, Forest Gate, London.
137,931. Elastic band with fastener, for retaining umbrella ribs. H. F. McShane, 16 Fairlawn Mansions, Bedford Park, London.
137,942. Cushion wheel. E. B. Killen, 27 Queen Victoria street, London.
137,998. Reinforced pneumatic tire. W. L. Colmer, 16 The Crescent, Combs, Stowmarket, Suffolk.
138,010. Rubber pads for boot and shoe soles. Refers to specification No. 132,750 listed in THE INDIA RUBBER WORLD, January 1, 1920. H. J. Fussell, 3 St. George's Building, Upper Bristol Road, Bath, and E. G. Fussell, 167 Coldharbour Road, Clifton, Bristol.
138,029. Water-bottle and like stoppers. M. C. Schweinert, 226 Palisade avenue, West Hoboken, New Jersey, U. S. A.
138,089. Blow-off connections for tire inflators. Automatic Safety Tire Valve Corp., assignee of S. Kahn—both of 1765 Broadway, New York City, U. S. A. (Not yet accepted.)

ISSUED MARCH 31, 1920.

138,169. Coupling for mine ventilation hose. Refers to specification No. 106,219. N. B. Braly, 14 West Granite street, Butte, Montana, U. S. A.
138,195. Rubber pad for soles and heels. B. Etkind, 32 Houndsditch, London.
138,229. Rubber sole. J. Brandwood, Brandlesholme, Bury, Lancashire, and A. Thill, 33 Upper Bedford Place, London.
138,278. Artificial feet with rubber cushioned joints. C. Desoutter, 51 Baker street, London.
138,294. Corset with elastic inserts. D. Kops, 525 West End avenue, Manhattan, New York City, U. S. A.
138,296. Shoe for retreading tires. C. C. Gates, 999 South Broadway, Denver, Colorado, U. S. A.
138,306. Valve for inflated balls and toy balloons. Société Etablissements Bognier et Burnet, 21 rue des Files du Calvaire, Paris. (Not yet accepted.)
138,358. Reinforced pneumatic tire provided with openings for cooling. T. C. McEwen, 20 Beach street, Belleville, New Jersey, U. S. A. (Not yet accepted.)

NEW ZEALAND.

ISSUED MARCH 11, 1920.

41,256 Rubber heel. C. J. Wattson, 8 Cliff Road, St. Clair, Dunedin, New Zealand.

AUSTRALIA.

TO AMERICANS.

11,192. Device for deflating pneumatic tires. H. P. Kraft, Ridgewood, N. J., U. S. A.

THE FRENCH REPUBLIC.

PATENTS ISSUED, WITH DATES OF APPLICATION.

499,528. (December 18, 1918.) Improvements in vehicle wheels. The Dunlop Rubber Co., Limited.
499,807. (May 19, 1919.) Pneumatic tire. L. Martenet.
499,965. (May 23, 1919.) Elastic dumb-bells. G. Schurr.
500,086. (May 27, 1919.) Life-saving dress. A. V. Sims.
500,094. (May 27, 1919.) Improvements in wheels, particularly those of airplanes. The Dunlop Rubber Co., Limited.
500,081. (May 27, 1919.) Improvements in electric insulation. P. Venturini.

GERMANY.

PATENTS ISSUED, WITH DATES OF APPLICATION.

320,335. (January 4, 1914.) Casing for wheel tires. The Dunlop Rubber Co., Limited, and Collin Macbeth, Birmingham, England.
321,105. (May 6, 1914.) Casing for resilient tire. R. Strong, Farnborough, England.
321,139. (June 13, 1919.) Packing and insulating material. G. Ruth and Dr. E. Asser, Wandsbek.
321,186. (February 11, 1914.) Tire in which a soft rubber layer is interposed between an ebonite ring and the hard rubber outer casing. St. Helens Cable & Rubber Co., Limited, Arple, near Warrington, England.

TRADE MARKS.

THE UNITED STATES.

NO. 100,457. Representation of a shoe behind the letter T—boots and shoes made of leather, rubber, and canvas. Thomson Shoe Co., St. Paul, Minn.
109,995. The words LET-ER-RAIN within a circle behind a cross-bar—waterproof clothing. Union City Manufacturing Co., Union City, Tenn.
111,596. Representation of a seal bearing the word NUSEAL—tire-filling compound. The Middletown Accessory-Laboratories Co., Middletown, O.
115,191. Representation of a tag bearing the word TAG having the cross-piece of the G extending to form a dash after the word—sphygmomanometers, syringes, etc. Charles J. Tagliabue Manufacturing Co., Brooklyn, N. Y.
115,192. The word TAG, having the letters A and G joined by a short connecting line from the foot of the right leg of the A—sphygmomanometers, syringes, etc. Charles J. Tagliabue Manufacturing Co., Brooklyn, N. Y.
116,241. The word "ZIP" quoted—self-vulcanizing tire patches. J. M. Stucker, Rosedale, Kans.
117,346. Representation of a round seal or label bearing the figure of an athlete balancing a ball between the words ME DAR—sporting goods including game balls, rubber bladders, striking bags, etc. Fred Medart Manufacturing Co., St. Louis, Mo.
120,393. The word UNIQ—running-board mats, heel rests, etc., for automobiles. The C. Spiro Manufacturing Co., New York City.
121,385. The word DURATOP—waterproof textile fabrics. The Duratex Co., Newark, N. J.
122,024. The word RODEX—waterproof coats. W. O. Peake, Limited, London, Eng.
122,907. The words O-PEE-CHEE—chewing gum. O-Pee-Chee Gum Co., Limited, London, Ont., Can.
123,501. The representation of a loon above the word LOON—waterproof fabrics. James Scarlett, Seattle, Wash.
123,530. The word AP-RUCO—canvas outing shoes. Apsley Rubber Co., Hudson, Mass.
123,988. Representation of a label bearing the letters and words L. P. L. CHIC-L-MINT JR. CO. on a combined circle and diagonal cross-bar—chewing gum. L. P. Larson, Jr., Co., Chicago, Ill.
124,017. The word WEARMOOR—raincoats. Franklin Simon & Co., Inc., New York City.
124,238. The word HUSKIE—tires, tire casings, and inner tubes. The Portage Rubber Co., Barberton, O.
124,391. The word BLACKSTONE—tires, tire casings, and inner tubes. The Canton-Blackstone Co., Canton, O.
124,962. The words WESTERN STATES, having the letters W and N larger than the others with the word States between them—tires, inner tubes, tire boots, and tire patches. Washington Tire & Rubber Co., Spokane, Wash.
124,963. The letters W and S superimposed on the upper and lower parts of the circumference of a heavy black circle—tires, inner tubes, tire boots, and tire patches. Washington Tire & Rubber Co., Spokane, Wash.
125,003. The word FLEXYDE—composition rubber material in sheet form. The Marathon Tire & Rubber Co., Cuyahoga Falls, O.
125,143. Representation of a double-outlined geometrical figure—chewing gum. Wm. Wrigley, Jr., Co., Chicago, Ill.
125,302. The words "GEM-DANDY" quoted—garters. Penn Bros. Suspender Co., Madison, N. C.
125,576. The words "KLEAR-SKIN" quoted, above the head of a girl holding a sponge against her face—rubber sponges. The Miller Rubber Co., Akron, O.
126,259. Outline of a rubber heel bearing the word Scoop, and the representation of a scoop—rubber and rubber composition heels. Panther Rubber Manufacturing Co., Stroughton and Chelsea, Mass.
126,558. Representation of a conventionalized double-headed animal beneath the name J. & T. COUSINS CO. and above the words NEW YORK, U. S. A.—rubber and fabric boots and shoes. J. & T. Cousins Co., Brooklyn, N. Y.
126,905. The figure and letters 3MORE with the letters in lower case type —garters. Penn Rivet Corp., Philadelphia, Pa.
127,254. The word RELLIM—water bottles, syringes, and rubber tubes. The Miller Rubber Co., Akron, O.

THE DOMINION OF CANADA.

25,590. The word FLEXO—garters, hose supporters, and arm bands. A. Stein & Co., Chicago, Ill., U. S. A.
26,059. Representation of the head of a bull moose, with the name "THE MERCHANTS RUBBER CO., LIMITED" in different sizes of block type, arranged so as to form a base—rubber footwear. Canadian Consolidated Rubber Co., Limited, Montreal, Que.
26,062. The word OUTLOOK in fancy letters—windshield cleaners. The Outlook Co., Cleveland, O., U. S. A.
26,068. The number and word 4810 AIRTITE—rubber hose. Canadian Consolidated Rubber Co., Limited, Montreal, Que.
26,071. The word ADMIRATION—belting, hose, and packing of all kinds. Dunlop Tire & Rubber Goods Co., Limited, Toronto, Ont.
26,101. The letters K. & S. arranged within a circular band—tires, tubes, and accessories; rubber goods molded, blown, dipped, hand made; mechanical rubber goods, and footwear. K. & S. Canadian Tire & Rubber Co., Limited, Toronto, Ont.
26,108. The word ECONOMY—rubber and rubber composition and fiber taps for boots and shoes. Emery Heel Sales Co., Boston, Mass., U. S. A.

THE UNITED KINGDOM.

384,720. The word HERMETIC—tire valves, etc. The Self-Sealing Rubber Co., Limited, Hermetic Works, Ryland street, Birmingham, Warwickshire.
384,721. The word HERMETIC—linen or hemp canvas prepared for tire manufacture, rubber-proofed canvas, etc. The Self-Sealing Rubber Co., Limited, Hermetic Works, Ryland street, Birmingham, Warwickshire.
384,722. The word HERMETIC—tires, inner tubes, repair patches, rubber bulbs, heel pads, etc. The Self-Sealing Rubber Co., Limited, Hermetic Works, Ryland street, Birmingham, Warwickshire.
384,723. The word HERMETIC—repair outfits for tires, vulcanized fiber, electrical insulating tapes, hose, etc. The Self-Sealing Rubber Co., Limited, Hermetic Works, Ryland street, Birmingham, Warwickshire.
388,638. The word ARIEL—all rubber goods in Class No. 40 except elastic webs and cords used in manufacturing clothing. Ariel Works, Limited, Ariel Works, Bournbrook, Birmingham.
389,633. The word NASACLES—respirators. A. St. J. Cooke, 40A Hyde Park Gate, London, S.W.7.
389,668. The words in script, EL CONDE DE RAMIREZ DE ARELLANO—gas-masks and respirators. F. J. H. y Ramirez de Arellano, el Conde de Ramirez de Arellano, Batchelor's Farm, Barns Green, near Horsham, Sussex.

389,905. Representation of an electrical insulator bearing the word WALGER, within a diamond—insulators and insulating preparations included in Class No. 40. E. A. Walshaw, Glasgow Road, Bolton, County of Peel, Ontario, Canada.

391,055. The word Rosco within a conventionalized figure inside of a diamond made up of black and white oblong checks—artificial leather. The Rossendale Rubber Co., Limited, Shawclough Rubber Works, Shawclough Road, Waterfoot, near Manchester.

391,099. Representation of an airplane with a woman aviator, bearing the words ANTI-FLU INHALER, the whole above the words (AUNTIE-FLEW) in parentheses—non-medicated inhalers included in Class No. 11. C. J. Clamp, 8 Botolph Lane, Eastcheap, London, E. C. 3.

393,726. The word Stoco—rubber-rimmed safety goggles, etc. The Standard Optical Co., 160 Lyceum street, Geneva, N. Y., U. S. A. (Care of C. W. Dommett & Son, 46 Gresham street, London, E. C. 2.)

393,449. The word Usco—tires and parts of tires. United States Rubber Co., 1790 Broadway, New York City, U. S. A. (Care of Haseltine, Lake & Co., 28 Southampton Buildings, London, W. C. 2.)

393,451. The word "Usco" quoted—rubber heels. United States Rubber Co., 1790 Broadway, New York City, U. S. A. (Care of Haseltine, Lake & Co., 28 Southampton Buildings, London, W. C. 2.)

395,985. The word RAYNBO—rubber erasers. F. Chambers & Co., Limited, The Garden Pencil Works, Derby Road, Stapleford, Nottinghamshire.

396,183. The word RUBROX—all goods included in Class No. 40. Herbert J. Fussell & Co., Locksbrook Rubber Mills, Locksbrook Road, Lower Weston, Bath.

396,215. Representation of head of Minerva above the word MINERVA—goods manufactured from rubber and gutta percha except heel pads, etc. Copestake, Crampton & Co., 5 Bow Church Yard, London, E. C. 4.

396,240. The words EL PELOTARI above representation of a juggler of ball and swords, all above a scroll—rubber and gutta percha goods not included in classes other than Class No. 40. Kolp Coleman & Co., 5 Hall street, Manchester.

396,307. The word PALATINE—all rubber goods including Class No. 11. The Leyland & Birmingham Rubber Co., Limited, Golden Hill Works, Leyland, Lancashire.

396,308. The word PALATINE—all rubber goods included in Class No. 38. The Leyland & Birmingham Rubber Co., Limited, Golden Hill Works, Leyland, Lancashire.

396,309. The word PALATINE—all rubber goods included in Class No. 39. The Leyland & Birmingham Rubber Co., Limited, Golden Hill Works, Leyland, Lancashire.

396,418. The word VULKASET—brushes included in Class No. 50. C. H. Leng & Sons, Reliance Works, Sherbourne Road, Balsall Heath, Birmingham.

396,480. The word FOYNTA—foot balls. Jackson & Blackburn, 51 Park Square, Ossett, near Wakefield, Yorkshire.

396,578. Representation of a lizard above the word LIZARD—fountain pens. A. W. Brooke, "Mera Ghar," Woodhey, Rock Ferry, Cheshire.

396,595. The word BTORACO—goods manufactured from rubber and gutta percha, not included in classes other than No. 40. Brotherton, Ratcliffe & Co., Limited, Winchester House, Old Broad street, London, E. C. 2.

396,776. The word "SOQUETTE" within quotation marks—a game called table football. George A. J. Thompson, 405 Rotherhithe New Road, North Camberwell, London, S. E. 16.

396,849. The word ALADDIN—goods manufactured from rubber and gutta percha. Industrial Rubber Products, Limited, Brook House, 191-192 Tottenham Court Road, London, W. 1.

396,855. The word SALCANI—sanitary appliances. A. de St. Dalmas & Co., 40 Belgrave Gate, Leicester.

396,936. The word INDRUPRO—goods manufactured from rubber and gutta percha. Industrial Rubber Products, Limited, Brook House, 191-192 Tottenham Court Road, London, W. 1.

397,073. Representation of a label bearing the bust of a girl and the quoted word "ELARCO"—surgical rubber goods and druggists' sundries. L. A. Jackson, trading as London Rubber Co., 183 Aldersgate street, London, E. C. 1.

397,132. The word TREVA—electrical insulators, etc., of ebonite or like substances manufactured from rubber or gutta percha. Trevelyan & Co., 155 Bracebridge street, Birmingham.

397,155. The word LASTIBAC—corsets. Drew, Son & Butcher, Limited, Gascoyn Factory, Trim street, Bath.

397,301. The words BLACK ADDER—garden hose. Reliance Rubber Co., Limited, 212-213 Upper Thames street, London, E. C. 4.

397,314. The word FOUNTAIN—pneumatic tires. J. A. Andrews, 4 Marldon avenue, Great Crosby, Liverpool.

397,445. The word TYRIAN above a tire inclosing the monogram T. R. Co., all above the words Trade Mark—tires. Tyer Rubber Co., Andover, Mass., U. S. A. (Care of B. J. Wildbore & Son, 38 Great Tower street, London, E. C. 3.)

397,512. The word FUSILITE—artificial leather. The British Airless Tyre Co., Limited, Wells Road, Westfield, Radstock, Somerset.

397,722. The word HERWHIT—rubber and gutta percha goods not included in classes other than Class No. 40. Herbert Whitworth, Limited, Whitworth House, 115 Princess street, Manchester.

397,757. The word IRIDIO—rubber and gutta percha goods not included in classes other than Class No. 40. F. E. Freeman, A. E. Derrick, and C. L. Lovesey, trading as partners, 23 Lansdown Parade, Cheltenham.

397,871. The word BRENTFIELD—pressure gages and indicators for vulcanizing plant. The Dental Chair & Engineering Co., Limited, New River Works, Dog Lane, Neasden, London, N. W. 10.

397,880. Representation of a jay in a bush and the initials and word J. T., LONDON—all rubber goods included in Class No. 11. James Tompkins, Limited, 386, City Road, London, E. C. 1.

397,881. Representation of a jay in a bush and the initials and word J. T., LONDON—all rubber goods included in Class No. 40, not included in other classes. James Tompkins, Limited, 386 City Road, London, E. C. 1.

397,899. The word ALMINKO—balata belting. The General Commercial Co. of London, Limited, 114 Cannon street, London, E. C. 4.

398,087. The word MAGNUM—golf balls. The Dunlop Rubber Co., Limited, Dunlop House, Albany street, Regent's Park, London, N. W. 1.

398,195. Representation of a label bearing the words GREYHOUND TIRES AND TUBES, with a tire rolling along the roadway of a landscape, pursued by greyhounds, and the words ON THE TRAIL OF A GOOD TIRE in the foreground—tires and tubes. North Western Motors, Limited, Mersey Chambers, Covent Garden, Liverpool.

AUSTRALIA.

TO AMERICANS.

22,986. Representation of seal bearing words THE "ANTI-COLIC" BRAND, THREE-HOLE NIPPLES, BALL TOP—rubber nursing nipples. C. W. Meinecke, New York City, U. S. A.

23,946. Representation of setting sun, with words SUN BRAND—rubber or mackintosh clothing, rubber boots and shoes. Gutta Percha & Rubber, Limited, Toronto, Ont., Can.

23,978. Representation of Maltese cross with company's name inside round band—rubber or mackintosh clothing, rubber boots and shoes. Gutta Percha & Rubber, Limited, Toronto, Ont., Can.

23,979. Same as No. 23,978—rubber hose, packing, etc. Gutta Percha & Rubber, Limited, Toronto, Ont., Can.

23,980. Same as No. 23,946—rubber hose, packing, etc. Gutta Percha & Rubber, Limited, Toronto, Ont., Can.

24,713. The words HALF SOLE TIRE—tires. Gates Rubber Co., Denver, Colo., U. S. A.

25,075. The word TESTRESTOS—brake lining. American Asbestos Co., Norristown, Pa., U. S. A.

25,191. Representation of a face within a tire and the word LEE—tires, inner tubes, patches, rubber belting, etc. Lee Tire & Rubber Co., New York City, U. S. A.

25,417. Representation of a star with the word STAR—tires, patches, tire liners, retread beading, etc. Star Rubber Co., Akron, O., U. S. A.

25,662. The letter N within a circle—tires, casings, and inner tubes. The Norwalk Tire & Rubber Co., Norwalk, Conn., U. S. A.

25,910. The word SAVOLD—rebuilt tires, tire casings, inner tubes, etc. S. H. Goldberg, Chicago, Ill., U. S. A.

26,062. Representation of cord tire around firm name, which in turn encircles the figure of a globe with diagonal marks—rubber or gutta percha goods. The Manhattan Rubber Manufacturing Co., Passaic, N. J., U. S. A.

26,063. Same as No. 26,062—packing and hose. The Manhattan Rubber Manufacturing Co., Passaic, N. J., U. S. A.

26,385. The word RAYNSTER—rubber clothing. United States Rubber Co., New Brunswick, N. J., U. S. A.

26,424. A red disk on end of barrel—fountain pens. The Evans Dollar Pen Co., Waterloo, Ia., U. S. A.

26,425. The words THE KADY—garters, suspenders, belts, etc. The Ohio Suspender Co., Mansfield, O., U. S. A.

26,428. The words VITALIC TIRES—pneumatic tires and tubes. Continental Rubber Works, Erie, Pa., U. S. A.

26,461. Representation of a Liberty cap above the word LIBCO—rubber tires. Liberty Steel Products Co., Inc., New York City.

26,563. The words KELLY-SPRINGFIELD within a circle—pneumatic tires. Kelly-Springfield Tire Co., New York City, U. S. A.

NEW ZEALAND.

TO AMERICANS.

14,472. Representation of a label bearing the words THE "ANTI-COLIC" BRAND THREE-HOLE BALL TOP NIPPLES, etc., with notice of registration in the United States and Canada of the trade mark "ANTI-COLIC" on a blue label on each nipple—rubber nipples for nursing bottles. C. W. Meinecke, 48 Park Place, New York City, U. S. A.

15,723. Representation of an arrow pointing toward the left—chewing gum. William Wrigley Junior Co., 5 North Wabash avenue, Chicago, Ill., U. S. A. (Associated with No. 13,319.)

15,760. The word EVERLOC—tire patches. W. C. Wood, trading as W. C. Wood Co., 74 Western avenue, Minneapolis, Minn., U. S. A.

16,321. The words VELVET GRIP in fancy script letters—hose supporters. George Frost Co., 551 Tremont street, Boston, Mass., U. S. A. (Associated with No. 14,091.)

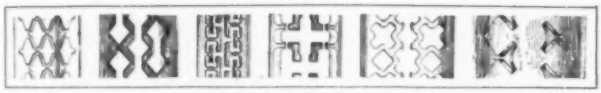
DESIGNS.

THE UNITED STATES.

NO. 54,720. Tire. Patented March 23, 1920. Term 14 years. A. L. Breitenstein, Akron, assignor to The Knox Tire & Rubber Co., Mount Vernon—both in Ohio.

54,725. Tire. Patented March 23, 1920. Term 14 years. J. Christy, Cleveland, O.

54,740. Tire. Patented March 23, 1920. Term 14 years. C. J. Hodges, assignor to The Quality Tire & Rubber Co.—both of Anderson, Ind.



54,720 54,725 54,740 54,758 54,797 54,844

54,758. Tire. Patented March 23, 1920. Term 14 years. L. B. Lyman, Tallmadge, O.

54,797. Pneumatic tire. Patented March 23, 1920. Term 14 years. M. L. Wiener, Akron, O.

54,844. Tire. Patented April 13, 1920. Term 14 years. E. G. Hulse, Akron, O., assignor to Kelly-Springfield Tire Co., New York City.

54,859. Rubber heel. Patented April 13, 1920. Term 14 years. T. Nicar, South Bend, Ind.

THE DOMINION OF CANADA.

4,702. Non-skid tread for vehicle tires. Patented January 20, 1920. The Gregory Tire & Rubber Co., Limited, Vancouver, B. C.

Review of the Crude Rubber Market.

NEW YORK.

THE CRUDE RUBBER MARKET was dull throughout April with a sharp decline toward the end of the month. The little trading in evidence was purely speculative, as the manufacturers continued to refrain from buying. The large arrivals of crude rubber continue and the rate of exchange and the strikes may have affected prices. Parás were dull, with little trading and little change in prices.

Prices for plantation and South American rubber at the beginning and toward the end of the month are shown in the following quotations:

PLANTATIONS. April 1, first latex crêpe, spot 46½ cents; May-June, 47½ cents; July-September, 48¾ cents; July-December, 49½ cents; January-June, 1921, 51½ cents; April 26, spot, 42½ cents; May-June, 43¼ cents; July-September, 44 cents; July-December, 44½ cents; January-June, 1921, 47 cents.

April 1, ribbed smoked sheets, spot, 46 cents; May-June, 47¼ cents; July-September, 48¾ cents; July-December, 49½ cents; January-June, 1921, 51½ cents; April 26, spot, 42½ cents; May-June, 42½ cents; July-September, 44 cents; July-December, 44½ cents; January-June, 1921, 47 cents.

April 1, No. 1 amber crêpe, spot, 46 cents; May-June, 46 cents; July-December, 47 cents; April 26, spot and futures, 45 cents.

April 1, No. 1 rolled brown crêpe, spot, 40 cents; May-June, 40 cents; July-December, 40½ cents; April 26, spot and futures, 35 cents.

SOUTH AMERICAN PARÁS AND CAUCHO. April 1, spot prices: upriver fine 42 cents, islands fine 41½ cents, upriver coarse 31 cents, islands coarse 21½ cents, Cametá coarse 22 cents, caucho ball 32 cents.

April 26, upriver fine 42 cents, islands fine 40-41½ cents, upriver coarse 31 cents, islands coarse 22 cents, Cametá coarse 22 cents, caucho ball 31½ cents.

NEW YORK QUOTATIONS.

Following are the New York spot quotations, for one year ago, one month ago and on April 26, the current date:

	May 1, 1919.	April 1, 1920.	April 26, 1920.
PLANTATION HEVEA—			
First latex crêpe	$0.48½@	$0.46½@.47	$0.42½@.43
Amber crêpe No. 1	.46 @	.46 @	.44 @.45
Amber crêpe No. 2	.45 @	.45½@	.43 @
Amber crêpe No. 3	.44 @	.44½@	.42 @
Amber crêpe No. 4	.43 @	.42½@	.41 @
Brown crêpe, thick and thin, clean	.43 @	.43 @	.42 @
Brown crêpe, thin specky	.41 @	.41 @	.39 @
Brown crêpe, rolled	.34 @	.40 @	.34 @.35
Smoked sheet, ribbed, standard quality	.47½@	.46 @	.42½@.43
Smoked sheets, plain, standard quality	.46 @	.45 @	.40 @
Unsmoked sheet, standard quality	.44 @	@	@
Colombo scrap No. 1	.33 @	.33 @	.35 @
Colombo scrap No. 2	.30 @	.31 @	.32 @
EAST INDIAN—			
Assam crêpe	@	@	@
Assam onions	@	@	@
Penang block scrap	.39 @	@	@
PONTIANAK—			
Banjermassin	.14 @.17	.13 @	.13 @
Palembang	@	@	@
Pressed block	.23½@.25	.25 @	.25 @
Sarawak	.14½@	@	@
SOUTH AMERICAN—			
PARAS—			
Upriver fine	.56½@	.42 @.42½	.42 @
Upriver medium	@	.39½@.40	.39 @
Upriver coarse	.34½@	.31 @	.31 @
Upriver weak, fine	.43 @	.35 @	.36 @
Islands, fine	*.48 @	.41½@	*.41½@
Islands, medium	*.43 @	.39½@.40	*.38 @
Islands, coarse	*.22 @	.21 @.21½	.22 @
Cametá, coarse	*.23 @	.22 @	.22 @
Madeira, fine	@	@	.44 @
Acre Bolivian, fine	@	@	.42½@
Peruvian, fine	.53 @	.40¾@	.40 @
Tapajos, fine	.53 @	@	.40 @
SOUTH AMERICAN—			
CAUCHO—			
Lower caucho ball	$0.31 @	$0.30 @	$0.29 @
Upper caucho ball	.36 @	.32 @	.32½@
MANICOBAS—			
Ceara negro heads	.36 @	.36 @	*.33 @
Ceara scrap	.26 @	.30 @	*.30 @
Manicoba, 30% guarantee	.34 @	.32 @	*.30 @.33
Mangabeira thin sheet	.36 @	.30 @	.31 @
CENTRALS—			
Corinto scrap	.33 @	.28 @.29	.29 @.30
Esmeralda sausage	.33 @	.27 @.28	.29 @.30
Central scrap	.32½@	.26 @.27	@
Central scrap and strip	.32 @	.25 @.26	.27 @.28
Central wet sheet	.22 @	.20 @	.19 @
Guayule, 20% guarantee	.30 @	.27 @	.28 @
Guayule, washed and dried	.40 @	.38 @	.38 @
AFRICANS—			
Niger flake, prime	.22 @	.18½@	.18 @
Benguela, extra No. 1, 28%	@	.26½@	.25 @
Benguela, No. 2, 32½%	@	.23 @	.21 @
Congo prime, black upper	.42 @	@	.37 @
Congo prime, red upper	.40 @	@	.33 @
Kassai black	@	.38 @	@
Kassai red	@	@	.35 @
Rio Nunez ball	.50 @	@	.36 @
Rio Nunez sheets and strings	.50 @	.36 @	.34 @
Conakry niggers	.50 @	.35 @	.34 @
Massai sheets and strings	.50 @	@	.34 @
GUTTA PERCHA—			
Gutta Siak	.26 @	.29 @.30	.30 @.31
Red Macassar	3.20 @	2.60 @	2.70 @
BALATA—			
Block, Ciudad Bolivar	.76½@	.58 @.60	.67 @.68
Colombia	@	.49 @.50	.53 @.54
Panama	.46 @.47	.40 @.46	.48 @.50
Surinam sheet	.97 @.99	.78 @	.84 @
amber	@	.82 @	.86 @

*Nominal.

RECLAIMED RUBBER.

Essentially the same conditions which prevailed in the reclaimed rubber market during February and March controlled the situation of reclaimed in all grades during April. Reclaimers are oversold for from two to three months, consequently are not seeking business. Prices, however, have not been advanced and remain as reported last month. Current buying is in relatively small volume and large users are not seeking to make commitments beyond the middle of the year.

NEW YORK QUOTATIONS.

April 26, 1920.

Prices subject to change without notice.

Standard reclaims:	
Floating	$0.30 @$0.35
Friction	.35 @ .40
Mechanical	.12½@ .13½
Red	.23 @ .24
Shoe	.16 @ .16½
Tires, auto	.16 @ .17
truck	.13 @ .14
White	.22 @ .25

COMPARATIVE HIGH AND LOW NEW YORK SPOT RUBBER PRICES.

	April. [1]1920.	April. 1919.	April. 1918.
PLANTATIONS:			
First latex crêpe	$0.46½@$0.42½	$0.51 @$0.47½	$0.70 @$0.59
Smoked sheet ribbed	.46 @ .42	.50 @ .47	.70 @ .59
PARAS:			
Upriver, fine	.42 @ .41½	.56 @ .56	.70 @ .60
Upriver, coarse	.32 @ .31	.34 @ .34	.39 @ .34
Islands, fine	.42 @ .41	.47½@ .47½	.55 @ .48
Islands, coarse	.21½@	.21½@ .21½	.28 @ .23
Cametá	.22½@	.22½@ .22½	.28 @ .23

[1]Figured only to April 26, 1920.

THE MARKET FOR COMMERCIAL PAPER.

In regard to the market for crude rubber paper, Albert B. Beers, 1 Liberty street, New York City, advises us follows:

"During April there has been a fair demand for paper from out-of-town banks, but New York banks have been buying very little. Rates on the best rubber names have ruled at 7 to 7½ per cent, mostly the higher rate."

SINGAPORE RUBBER MARKET.

GUTHRIE & CO., LIMITED, Singapore, report [March 4, 1920]:

The usual weekly auctions held yesterday and today opened with a steady demand for all grades (with the exception of fine pale crêpe) which continued throughout the sales. Fine pale crêpe, which was distinctly out of favour, and of which only a few lots were sold, realized up to $1.07 (two lots sold at $1.08½ and one lot at $1.07½) or 1½ cents lower than last week's price. Ribbed smoked sheet fetched up to $1.10½, or the same as last auctions. The lower grades sold at from 1½ to 4 cents below last auction's prices. Out of 1,168 tons catalogued, 945 tons were offered and 557 tons sold.

The following is the course of values:

	In Singapore, per Pound[1].			Sterling Equivalent per Pound in London.		
Sheet, fine ribbed smoked	107c	@	110½c	2/ 8½	@	2/9½
Sheet, good ribbed smoked	100	@	106½	2/ 6½	@	2/8¾
Crêpe, fine pale	105	@	107	2/ 8¾	@	2/9
Crêpe, good pale	99	@	104	2/ 6¾	@	2/8½
Crêpe, fine brown	92	@	100	2/ 4¾	@	2/7
Crêpe, good brown	87	@	91½	2/ 3⅜	@	2/4⅝
Crêpe, dark	82	@	88	2/ 1⅞	@	2/3⅜
Crêpe, bark	72	@	83	1/11⅛	@	2/2¼

[1] Quoted in Straits Settlements currency; $1 = $0.567 United States currency.

AMSTERDAM RUBBER MARKET.

JOOSTEN & JANSSEN, Amsterdam, report [April 1, 1920]:

The rubber market was again very quiet, for spot as well as for those parcels still in the boats already arrived. Sellers are still asking their former prices, in spite of the lower oversea markets; New York also quoted slightly lower prices. There was a little inquiry on our market, but only at cheaper prices. The unchanged outlook in the strike makes business very difficult, and the approaching holidays do not tend to make matters more lively.

On the terminal market there was only a limited turn-over, as there were more sellers than buyers, the latter only at lower prices. Taken all around our terminal market has kept very steady compared with foreign markets. Prices have ranged from f. 1.37 to f. 1.38½.

ANTWERP RUBBER MARKET.

GRISER & CO., Antwerp, report [April 1, 1920]:

We have no changes to report, prices continuing depressed, although now they are at the same level as before the war. The price of Sumatra smoked sheet is 14.20 francs. The stock of india rubber at Antwerp is 560 tons.

As usual at Easter time, the future market shows absolutely no dealings; lack of interest everywhere. The closing price for the next twelve months is 13.40 francs.

BATAVIA RUBBER MARKET.

HERMANS, MARSMAN & CO., Batavia, report [December 16, 1919-January 15, 1920]:

A good demand prevailed during the first week under review and prices increased as far as 1.48 florins for prime smoked sheets and fine pale crêpe, ready delivery. Afterwards the tone of the market became dull and prices dropped quickly, on account of the decreased rates of exchange on London and Singapore. The market closed with a slight improvement and small lots changed hands at: f. 1.40 for fine pale crêpe, f. 1.41 for prime smoked sheets and f. 1.35 for off crêpe, while lower grades remained without interest. At the moment there is some demand for forward deliveries at f. 1.44 for prime grades.

PLANTATION RUBBER EXPORTS FROM JAVA.

	January.	
	1919.	1920.
To Netherlands ..... *kilos*	.....	.....
Great Britain	646,000	319,000
United States	1,423,000	148,000
Singapore	538,000	1,044,000
Other countries	64,000	391,000
Totals	2,671,000	1,902,000
Ports of origin:		
Tandjing Priok	1,332,000	529,000
Samarang	22,000	74,000
Soerbaya	1,210,000	1,071,000
Probolinggo	.....	32,000
Cheribon	.....	4,000
Tjilatjap	.....	192,000

CEYLON RUBBER IMPORTS AND EXPORTS.

IMPORTS.

	January 1 to March 1.	
	1919.	1920.
Crude rubber:		
From Straits Settlements ..... *pounds*	145,044	621,073
British India	318,484	451,335
Burma and other countries	.....	6,300
Totals	463,528	1,078,708

EXPORTS.

Crude rubber:		
To United Kingdom ..... *pounds*	4,479,465	5,400,884
Belgium	.....	18,360
France	260,195	58,120
Australia	62,742	20,191
United States	14,266,471	5,034,300
Canada and Newfoundland	.....	257,600
India	1,612	.....
Straits Settlements	424	.....
Japan	35,880	52
Totals	19,106,789	10,789,627

(Compiled by the Ceylon Chamber of Commerce.)

EXPORTS OF CRUDE RUBBER FROM BELAWAN (DELI), SUMATRA.

	December.		Year Ended December 31.	
	1918.	1919.	1918.	1919.
To Netherlands—*pounds*	.....	762,216	.....	6,166,393
Great Britain	.....	608,373	3,383,600	9,087,313
Italy	.....	.....	.....	134,464
United States	461,001	2,049,868	6,694,600	19,644,170
Canada	.....	.....	132,000	.....
British India	.....	.....	330,000	.....
Japan	.....	.....	.....	2,156
Australia	.....	.....	.....	404,778
Penang	26,646	158,578	451,000	1,187,252
Singapore	1,914,444	1,079,375	17,307,400	21,334,775
Hongkong	.....	.....	.....	366,318
Other countries	.....	3,331	.....	3,331
Totals	2,402,091	4,661,741	28,298,600	58,330,950

FEDERATED MALAY STATES RUBBER EXPORTS.

An official report from Kuala Lumpur says that 9,781 tons of plantation rubber were exported from the Federated Malay States in the month of February, as against 11,119 tons in January and 10,809 tons in February of last year. The total exports for the two months were 20,900 tons, as compared with 17,972 tons in 1919, and 14,408 tons the year before. Appended are the comparative figures:

	1918.	1919.	1920.
January ..... *tons*	7,558	7,163	11,119
February	6,820	10,809	9,781
Totals	14,408	17,972	20,900

STRAITS SETTLEMENTS RUBBER EXPORTS.

An official report from Singapore states that 17,379 tons of rubber were exported from Straits Settlements ports in the month of February, compared with 13,125 tons in January, and 15,561 tons in the corresponding month last year. Transshipments for February amounted to 2,460 tons. For two months of the present year the exports amounted to 30,504 tons against 30,065 tons for the corresponding period in 1919, and 6,636 tons in 1918. Appended are the comparative statistics:

	1918.	1919.	1920.
January ..... *tons*	4,302	14,404	13,125
February	2,334	15,661	17,379
Tools	6,636	30,065	30,504

FRENCH INDO-CHINA RUBBER EXPORTS, 1908-1918.

	To France.		To Other Countries.	
	Kilograms.	Francs.[1]	Kilograms.	Francs.
1908	36,884	239,746	98	637
1909	32,163	144,734	3,219	14,485
1910	170,074	765,333	5,396	24,282
1911	227,359	1,023,115	17,783	80,024
1912	225,565	1,015,042	6,129	27,581
1913	168,676	759,043	45,259	203,665
1914	164,034	657,153	48,612	218,754
1915	376,741	1,692,635	600	2,700
1916	547,817	3,286,902	770	4,620
1917	930,803	5,584,818	25	190
1918	537,678	3,226,068	.....	.....

[1] One franc equals $0.193 United States currency.

(Bulletin Economique de l'Indo-Chine, Hanoi-Haiphong.)

UNITED STATES IMPORTS OF PLANTATION RUBBER BY PORTS—1919.[1]

1919	San Francisco.	Seattle.	Vancouver.	Tacoma.	Totals. Pacific Ports.	Totals. New York.
January ..... *tons*	433	2,162	951	.....	3,546	1,360
February	1,188	5,256	4,690	1,298	12,423	1,656
March	7,612	5,771	389	241	14,013	9,667
April	1,996	9,117	405	.....	11,518	13,160
May	5,254	2,200	.....	.....	7,454	7,402
June	907	.....	1,491	.....	2,398	11,247
July	474	987	54	223	1,738	15,907
August	2,335	384	233	141	3,093	5,128
September	823	.....	450	.....	1,273	8,870
October	548	329	834	.....	1,711	23,772
November	2,121	.....	274	.....	2,395	11,997
December	2,789	1,246	33	.....	4,068	21,852
Totals	22,249	27,452	9,804	1,894	65,630	132,018

[1] Reprinted to give complete statistics for Pacific ports.

(Compiled by the Rubber Association of America, Inc.)

UNITED STATES CRUDE RUBBER IMPORTS FOR 1920 (BY MONTHS).

1920.	Plantations.	Parás.	Africans.	Centrals.	Guayule.	Manicoba and Matto Grosso.	Totals for 3 Mons. 1920.	Totals for 3 Mons. 1919.
January ... *tons*	17,799	2,620	821	111	...	...	21,351	7,235
February	29,681	2,456	558	265	34	...	32,994	17,456
March*	28,533	2,463	514	23	114	3	31,650	28,223
Totals	76,013	7,539	1,893	399	148	3	85,995	52,914

*Also in March, balata, 113 tons; miscellaneous gums, 983 tons; waste, 1,252 tons.

(Compiled by The Rubber Association of America, Inc.)

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS.

PARAS AND CAUCHO AT NEW YORK.

	Fine.	Medium.	Coarse.	Caucho.	Totals. Pounds.
MARCH 24. By the S. S. *St. Bede*, from Pará.					
Poel & Kelly	.....	.....	31,193	.....	31,193
G. Amsinck & Co., Inc.	7,953	.....	6,193	9,981	24,127
A. Volle & Co.	65,824	11,220	48,826	.....	125,870
Meyer & Brown, Inc.	66,640	10,437	10,640	521	88,238
MARCH 26. By the S. S. *Polycarp*, from Pará.					
Poel & Kelly	50,664	11,248	29,402	28,787	120,101
Paul Bertuch	13,866	4,500	62,452	73,700	154,518
New York Overseas Co.	.....	.....	.....	.....	980
Meyer & Brown, Inc.	.....	.....	44,800	69,440	114,240
H. A. Astlett & Co.	.....	57,000	8,000	.....	65,000
Aldens' Successors, Inc.	.....	11,278	9,562	554	21,394
Hagemeyer & Brunn	112,000	.....	.....	.....	112,000
MARCH 27. By the S. S. *General W. C. Gorgas*, from Panama.					
W. R. Grace & Co.	.....	.....	.....	11,200	11,200
MARCH 27. By the S. S. *Manco*, from Pará and Manaos.					
Aldens' Successors, Inc.	.....	.....	15,486	.....	15,486
Meyer & Brown, Inc.	56,000	52,640	.....	.....	108,640
Poel & Kelly	47,270	9,111	24,689	24,972	106,042
G. Amsinck & Co., Inc.	51,240	14,580	68,400	.....	134,220
Hagemeyer Trading Co.	.....	.....	9,540	.....	9,540
Neuss Hesslein & Co.	.....	.....	.....	.....	1,475,280
Various	170,100	27,180	411,120	.....	608,400
MARCH 27. By the S. S. *Manco*, from Iquitos.					
Meyer & Brown, Inc.	53,900	.....	20,500	15,100	89,500
E. T. Grenier	.....	.....	.....	.....	9,933
G. Amsinck & Co., Inc.	.....	.....	.....	.....	9,519
H. A. Astlett & Co.	29,700	.....	83,000	155,000	267,700
Various	.....	.....	.....	.....	461,437
APRIL 11. By the S. S. *Byron*, from Pará.					
Poel & Kelly	.....	.....	.....	.....	16,366
Goldman, Sachs & Co.	.....	.....	.....	.....	12,936
H. A. Astlett & Co.	.....	.....	.....	45,000	45,000
Meyer & Brown, Inc.	66,640	.....	1,680	22,960	91,280
Aldens' Successors, Inc.	.....	2,138	6,173	3,430	11,741
Hagemeyer & Brown	224,000	.....	22,400	112,000	358,400
Paul Bertuch	.....	.....	25,463	.....	25,463
APRIL 12. By the S. S. *Iver Heath*, from Montevideo.					
Laidlaw, Kelley & Co.	.....	.....	.....	.....	18,032
Thornton & Co.	.....	.....	.....	.....	4,508

PLANTATIONS.

(*Figured* 180 *pounds to the bale, or case.*)

	Shipment from:	Shipped to:	Pounds.	Totals.
MARCH 9. By the S. S. *Santa Cruz*, at San Francisco.				
Various	Singapore	San Fran.	638,280	
Various	Honolulu	San Fran.	638,280	1,276,560
MARCH 18. By the S. S. *Choyo Maru*, at San Francisco.				
Fred Stern & Co.	Singapore	San Fran.	660,960	
Rubber Trading Co.	Singapore	San Fran.	20,160	
J. T. Johnstone & Co., Inc.	Singapore	San Fran.	30,240	
Robert Dollar Co.	Singapore	San Fran.	540	
Various	Singapore	San Fran.	164,520	
Various	Soerabaya	San Fran.	26,100	
Mitsui & Co., Limited.	Soerabaya	San Fran.	99,540	
The Goodyear Tire & Rubber Co.	Batavia	Akron	256,860	
The B. F. Goodrich Co.	Batavia	Akron	102,780	
The Goodyear Tire & Rubber Co.	Soerabaya	Akron	231,660	
Firestone Tire & Rubber Co.	Penang	Akron	430,380	
Smith & Schippers	Singapore	San Fran.	85,680	
Firestone Tire & Rubber Co.	Singapore	Akron	432,360	
Various	Batavia	San Fran.	26,280	2,568,060
MARCH 19. By the S. S. *West Caddoa*, at San Francisco.				
Firestone Tire & Rubber Co.	Penang	Akron	1,001,880	
F. R. Henderson & Co.	Penang	San Fran.	252,000	
Edward Boustead & Co.	Penang	San Fran.	86,400	1,340,280
MARCH 24. By the S. S. *Myrmidon*, at New York.				
F. R. Henderson & Co.	Soerabaya	New York	70,920	
Fred Stern & Co.	Soerabaya	New York	224,000	
Various	Batavia	New York	727,760	1,022,680
MARCH 25. By the S. S. *Anglo Egyptian*, at New York.				
Poel & Kelly	Liverpool	New York	2,160	
Fred Stern & Co.	Liverpool	New York	29,700	31,860
MARCH 25. By the S. S. *Defiance*, at New York.				
Chas. T. Wilson Co., Inc.	London	New York	30,060	
T. D. Downing & Co.	London	New York	92,880	
Meyer & Brown, Inc.	London	New York	86,240	
Aldens' Successors, Inc.	London	New York	202,284	
Fred Stern & Co.	London	New York	22,456	
Various	London	New York	647,284	1,081,204
MARCH 27. By the S. S. *Port Hacking*, at New York.				
T. D. Downing & Co.	London	New York	160,920	
Various	London	New York	166,680	327,600
MARCH 27. By the S. S. *Mancric*, at New York.				
Hood Rubber Co.	Far East	Watertown	22,500	22,500
MARCH 27. By the S. S. *Arabian Prince*, at New York.				
Adolph Hirsch & Co.	Singapore	New York	61,000	
Poel & Kelly	Singapore	New York	628,840	
Aldens' Successors, Inc.	Singapore	New York	22,468	
The B. F. Goodrich Co.	Singapore	Akron	41,400	
L. Littlejohn & Co., Inc.	Singapore	New York	277,200	
Bright & Golbrith	Singapore	New York	38,520	
Rubber Importers' & Dealers' Co., Inc.	Singapore	New York	405,100	
Winter, Ross & Co.	Singapore	New York	50,400	
Chas. T. Wilson Co., Inc.	Singapore	New York	278,180	
William H. Stiles & Co.	Singapore	New York	54,800	
Edward Maurer Co., Inc.	Singapore	New York	24,000	
Thos. A. Desmond & Co.	Singapore	New York	53,568	
Hadden & Co.	Singapore	New York	127,080	
Fred Stern & Co.	Singapore	New York	413,200	
Mitsui & Co., Limited.	Singapore	New York	106,560	
Rogers-Pyatt Shellac Co.	Singapore	New York	135,000	
The Fish Rubber Co.	Singapore	Chicopee Falls	272,700	
Meyer & Brown, Inc.	Singapore	New York	246,400	
General Rubber Co.	Singapore	New York	1,107,540	
The Goodyear Tire & Rubber Co.	Singapore	Akron	394,560	
Balfour, Williamson & Co.	Singapore	New York	11,520	
Thornett & Fehr, Inc.	Singapore	New York	92,980	
F. R. Henderson & Co.	Singapore	New York	45,000	
Rubber Trading Co.	Singapore	New York	78,400	
W. R. Grace & Co.	Singapore	New York	56,000	
Various	Singapore	New York	1,888,620	6,911,036
MARCH 28. Transhipped from the S. S. *Arakan* from Soerabaya, at San Francisco.				
L. Littlejohn & Co., Inc.	Soerabaya	New York	250,920	
L. Littlejohn & Co., Inc.	Batavia	New York	1,440	
Spreckels "Savage" Tire Co.	Batavia	San Diego	34,560	
Firestone Tire & Rubber Co.	Batavia	Akron	27,360	
Various	Soerabaya	San Diego	21,240	
Various	Soerabaya	Seattle	3,760	339,280
MARCH 29. By the S. S. *Akron*, at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	127,620	
United States Rubber Co.	Colombo	New York	540,000	
Firestone Tire & Rubber Co.	Colombo	New York	84,600	
Poel & Kelly	Colombo	New York	160,560	
J. Aron & Co.	Colombo	New York	38,520	
Rubber Trading Co.	Singapore	New York	22,400	973,700
MARCH 30. By the S. S. *Iconium*, at Seattle.				
Firestone Tire & Rubber Co.	Penang	Akro	370,800	
Gates Rubber Co.	Singapore	Denver	102,780	
Various	Singapore	Tacoma	22,680	496,260
MARCH 31. By the S. S. *Bellbuckle*, at New York.				
Various	Melbourne	New York	11,520	11,520
APRIL 1. By the S. S. *Koyo Maru*, at San Francisco.				
Mitsui & Co., Limited.	Singapore	New York	57,600	
Firestone Tire & Rubber Co.	Singapore	Akron	599,560	
Gates Rubber Co.	Singapore	Denver	340,020	
Various	Singapore	San Diego	22,500	
Smith & Schippers	Penang	New York	47,880	
F. R. Henderson & Co.	Penang	New York	22,680	
Various	Penang	Akron	209,880	1,300,120
APRIL 1. By the S. S. *Vennonia*, at New York.				
Poel & Kelly	London	New York	129,060	
The B. F. Goodrich Co.	London	Akron	311,040	
Smith & Schippers	London	New York	211,680	
Mitsui & Co., Limited.	London	New York	191,340	
T. D. Downing & Co.	London	New York	116,280	
Meyer & Brown, Inc.	London	New York	48,160	
Various	London	New York	905,660	1,913,220
APRIL 2. By the S. S. *Saxonia*, at New York.				
L. Sutro & Co.	London	New York	46,080	
General Rubber Co.	London	New York	72,360	
Various	London	New York	80,100	198,540
APRIL 2. By the S. S. *Manitou*, at New York.				
Thornett & Fehr, Inc.	Liverpool	New York	3,420	3,420
APRIL 5. By the S. S. *Nitonian*, at Boston.				
Hood Rubber Co.	London	Watertown	44,473	44,473
APRIL 5. By the S. S. *City of Lahore*, at New York.				
Thornett & Fehr, Inc.	Colombo	New York	11,520	
C. C. Trevanion & Co.	Colombo	New York	146,880	
United States Rubber Co.	Colombo	New York	155,520	
The Goodyear Tire & Rubber Co.	Colombo	Akron	65,880	
Chas. T. Wilson Co., Inc.	Colombo	New York	54,360	
L. Littlejohn & Co., Inc.	Colombo	New York	65,340	
Rubber Trading Co.	Colombo	New York	67,200	
Fred Stern & Co.	Colombo	New York	22,400	
Various	Colombo	New York	313,240	902,340
APRIL 6. By the S. S. *Minnekahda*, at New York.				
T. D. Downing & Co.	London	New York	89,100	
Meyer & Brown, Inc.	London	New York	56,000	
Various	London	New York	284,020	429,120
APRIL 6. By the S. S. *Venusia*, at Portland, Maine.				
Meyer & Brown, Inc.	London	New York	67,200	67,200
APRIL 7. By the S. S. *Meranke*, at New York.				
Stein, Hall & Co., Inc.	Soerabaya	New York	112,860	
L. Littlejohn & Co., Inc.	Soerabaya	New York	666,540	
Goldman, Sachs & Co.	Soerabaya	New York	24,300	

	Shipment from:	Shipped to:	Pounds.	Totals.
The Goodyear Tire & Rubber Co.	Soerabaya	New York	69,300	
Thornett & Fehr, Inc.	Soerabaya	New York	17,100	
Java-Holland American Trading Co.	Soerabaya	New York	10,080	
Poel & Kelly	Soerabaya	New York	111,420	
Manhattan Rubber Manufacturing Co.	Soerabaya	New York	27,000	
L. Sutro & Co.	Soerabaya	New York	180	
E. Everett, Carleton & Co.	Soerabaya	New York	44,640	
Poel & Kelly	T'jong Priok	New York	39,060	
Fred Stern & Co.	T'jong Priok	New York	167,320	
The Goodyear Tire & Rubber Co.	T'jong Priok	Akron	261,000	
General Rubber Co.	T'jong Priok	New York	7,200	
Fred Stern & Co.	Sourabaya	New York	156,800	
Various	T'jong Priok	New York	142,740	
Aldens' Successors, Inc.	Bolivia	New York	66,138	1,923,678
APRIL 8. By the S. S. *Manhattan*, at New York.				
T. D. Downing & Co.	London	New York	270,900	
Thornett & Fehr, Inc.	London	New York	182,340	
Aldens' Successors, Inc.	London	New York	733,176	
Various	London	New York	215,424	1,401,840
APRIL 8. By the S. S. *Tenyo Maru*, at San Francisco.				
Various	Hongkong	San Francisco	36,360	
Various	Honolulu	East. Cities	36,360	72,720
APRIL 9. By the S. S. *Philadelphia*, at New York.				
The Goodyear Tire & Rubber Co.	Southampton	Akron	232,200	
Various	Southampton	New York	124,020	356,220
APRIL 9. By the S. S. *Clan Monroe*, at New York.				
United States Rubber Co.	Colombo	New York	216,000	
L. Littlejohn & Co., Inc.	Colombo	New York	16,020	
Chas. T. Wilson Co., Inc.	Colombo	New York	28,980	
Poel & Kelly	Colombo	New York	74,160	
T. M. Duche & Sons	Colombo	New York	7,120	
Meyer & Brown, Inc.	Colombo	New York	56,000	
Poel & Kelly	Cochin	New York	51,660	
Fred Stern & Co.	Cochin	New York	168,000	
Balfour, Williamson & Co.	Cochin	New York	30,960	
C. C. Trevanion & Co.	Cochin	New York	7,740	
Dunlop Rubber Co., Limited	Cochin	New York	80,640	
Vernon Metal & Produce Co.	Cochin	New York	57,780	
W. J. McDavid & Co., Inc.	Cochin	New York	10,980	
Various	Cochin	New York	183,420	
Rubber Trading Co.	Colombo	New York	6,720	996,180
APRIL 9. By the S. S. *Matura*, at New York.				
Middleton & Co., Limited.	Trinidad	New York	1,135	1,135
APRIL 12. By the S. S. *Port Elliot*, at New York.				
Poel & Kelly	London	New York	125,820	
Mitsui & Co., Limited	London	New York	243,360	
Baring Brothers	London	New York	484,740	
T. D. Downing & Co.	London	New York	464,400	
General Rubber Co.	London	New York	624,820	
The B. F. Goodrich Co.	London	Akron	250,380	
Various	London	New York	554,500	2,748,020
APRIL 12. By the S. S. *Eastern Coast*, at New York.				
Pacific Trading Corp. of America	Singapore	New York	42,840	
Raw Products Co.	Singapore	New York	18,000	
Fred Stern & Co.	Singapore	New York	98,280	
Various	Singapore	New York	84,280	243,400
APRIL 12. By the S. S. *Baltic*, at New York.				
Various	Liverpool	New York	46,080	46,080
APRIL 12. By the S. S. *Verbania*, at New York.				
General Rubber Co.	Liverpool	New York	64,440	
Poel & Kelly	Liverpool	New York	297,360	361,800
APRIL 12. By the S. S. *Bondowasso*, at San Francisco.				
Firestone Tire & Rubber Co.	Soerabaya	Akron	34,200	
L. Littlejohn & Co., Inc.	Soerabaya	New York	89,100	
Various	Soerabaya	San Francisco	111,240	234,540
APRIL 12. By the S. S. *Kentucky*, at New York.				
Chas. T. Wilson Co., Inc.	Colombo	New York	48,600	
Baring Brothers	Colombo	New York	20,160	
United States Rubber Co.	Colombo	New York	114,840	
The Goodyear Tire & Rubber Co.	Colombo	Akron	82,800	
Poel & Kelly	Colombo	New York	113,940	
L. Littlejohn & Co., Inc.	Colombo	New York	91,080	
H. P. Winter & Co.	Colombo	New York	36,000	
E. S. Kuh & Volk Co.	Colombo	New York	21,240	
Meyer & Brown, Inc.	Colombo	New York	44,800	
Rubber Trading Co.	Singapore	New York	22,400	
Fred Stern & Co.	Colombo	New York	56,000	
Various	Colombo	New York	305,300	957,160
APRIL 14. By the S. S. *Ida*, at New York.				
Rubber Importers & Dealers Co., Inc.	Singapore	New York	354,060	
Hood Rubber Co.	Singapore	Watertown	67,500	
The Goodyear Tire & Rubber Co.	Singapore	Akron	67,500	489,060
APRIL 15. By the S. S. *Start Point*, at St. Johns, N. B.				
Meyer & Brown, Inc.	London	New York	33,600	33,600

	Shipment from:	Shipped to:	Pounds.	Totals.
APRIL 15. By the S. S. *Grace Dollar*, at New York.				
F. R. Henderson & Co.	Singapore	New York	121,140	
Rogers-Pyatt Shellac Co.	Singapore	New York	248,580	
T. D. Desmond & Co.	Singapore	New York	102,240	
The Fisk Rubber Co.	Singapore	Chic'pee Falls	272,880	
Goldman, Sachs & Co.	Singapore	New York	614,880	
Meyer & Brown, Inc.	Singapore	New York	929,600	
Pell & Dumont, Inc.	Singapore	New York	33,480	
The B. F. Goodrich Co.	Singapore	New York	245,520	
Mitsui & Co., Limited	Singapore	New York	60,480	
Frank Waterhouse & Co.	Singapore	New York	28,800	
The Goodyear Tire & Rubber Co.	Singapore	New York	514,080	
Fred Stern & Co.	Singapore	New York	27,540	
L. Littlejohn & Co., Inc.	Singapore	New York	260,460	
The United Malaysian Rubber Co., Limited.	Singapore	New York	67,200	
Hadden & Co.	Singapore	New York	69,120	
Mitsui & Co., Limited	Penang	New York	144,180	
C. F. McPhillips	Penang	New York	18,440	
Mitsubishi Goshi Kaisha.	Penang	New York	56,700	
General Rubber Co.	Penang	New York	1,078,740	
Rubber Importers & Dealers Co.	Penang	New York	224,000	
The Fisk Rubber Co.	Medan	Chic'p'e Falls	21,240	
General Rubber Co.	Medan	New York	34,560	
Aldens' Successors, Inc.	Port Swet'n'm	New York	68,400	
Various	Penang	New York	165,240	
Rubber Trading Co.	Singapore	New York	11,200	
Aldens' Successors, Inc.	Singapore	New York	270,160	
W. R. Grace & Co.	Singapore	New York	113,930	
Various	Singapore	New York	556,870	6,359,660
APRIL 17. By the S. S. *Celtic Prince*, at New York.				
F. R. Henderson & Co.	Singapore	New York	787,860	
Rogers-Pyatt Shellac Co.	Singapore	New York	147,600	
Thos. A. Desmond & Co.	Singapore	New York	373,500	
L. Littlejohn & Co., Inc.	Singapore	New York	143,280	
Joosten & Janssen.	Singapore	New York	65,880	
Rubber Importers & Dealers Co., Inc.	Singapore	New York	705,600	
The B. F. Goodrich Co.	Singapore	Akron	72,540	
Balfour, Williamson & Co.	Singapore	New York	138,240	
Aldens' Successors, Inc.	Singapore	New York	119,854	
Meyer & Brown, Inc.	Singapore	New York	27,000	
W. G. Ryckman, Inc.	Singapore	New York	43,200	
The Goodyear Tire & Rubber Co.	Singapore	New York	428,580	
Vernon Metal & Produce Co.	Singapore	New York	80,640	
Fred Stern & Co.	Singapore	New York	268,000	
Poel & Kelly	Singapore	New York	12,600	
Firestone Tire & Rubber Co.	Singapore	Akron	195,840	
Thornett & Fehr, Inc.	Singapore	New York	54,000	
Meyer & Brown, Inc.	Singapore	New York	44,800	
The United Malaysian Rubber Co., Limited.	Singapore	New York	67,200	
Various	Singapore	New York	2,628,600	6,404,814
APRIL 19. By the S. S. *Egremont Castle*, at New York.				
W. R. Grace & Co.	Singapore	New York	56,000	
Fred Stern & Co.	Singapore	New York	224,000	
Rubber Importers & Dealers Co., Inc.	Singapore	New York	22,400	
Rubber Trading Co.	Singapore	New York	71,680	
Meyer & Brown, Inc.	Singapore	New York	11,200	
Edward Maurer Co., Inc.	Penang	New York	14,400	
William H. Stiles & Co.	Penang	New York	49,500	
Thornett & Fehr, Inc.	Penang	New York	49,500	
Aldens' Successors, Inc.	Penang	New York	95,943	
Mitsui & Co., Limited	Penang	New York	22,680	
C. F McPhillips	Penang	New York	28,620	
Various	Penang	New York	329,940	
Various	Singapore	New York	3,124,000	4,099,863
APRIL 20. By the S. S. *Atreus*, at New York.				
Hood Rubber Co.	Far East	Watertown	112,000	112,000
APRIL 22. By the S. S. *Tyndareus*, at Seattle.				
Fred Stern & Co.	Singapore	New York	112,000	112,000
CENTRALS.				
MARCH 26. By the S. S. *General O. H. Ernst*, at New York.				
Ogerdan Co.	Cristobal	New York	300	300
MARCH 27. By the S. S. *General W. C. Gorgas*, at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	3,600	
Andean Trading Co.	Cristobal	New York	15,000	18,600
MARCH 27. By the S. S. *Ancon*, at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	4,500	
Ultramares Corp.	Cristobal	New York	3,000	
Mecke & Co.	Cristobal	New York	3,200	
Various	Cristobal	New York	2,250	53,450
APRIL 5. By the S. S. *Frednes*, at New York.				
Ultramares Corp.	Columbia	New York	8,250	
Cortissan & Co.	Columbia	New York	600	8,850
APRIL 6. By the S. S. *Gen. G. W. Goethals*, at New York.				
Wellman, Peck & Co.	Cristobal	New York	1,500	
Mecke & Co.	Cristobal	New York	8,100	
Various	Cristobal	New York	2,160	11,760
APRIL 8. By the S. S. *Jacinto*, at New York.				
Tauman & Kamp.	Vera Cruz	New York	2,850	2,850
APRIL 12. By the S. S. *W. M. Tupper*, at New York.				
Ultramares Corp.	Cartagenia	New York	4,950	4,950
APRIL 16 By the S. S. *Panama*, at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	46,050	
M. A. de Lion & Co.	Cristobal	New York	150	46,200

	Shipment from:	Shipped to:	Pounds.	Totals.
APRIL 19. By the S. S. *Egremont Castle*, at New York.				
Aldens' Successors, Inc.	Colombo	New York	19,800	
Chas. J. Wilson Co., Inc.	Colombo	New York	172,950	192,750
APRIL 19. By the S. S. *Matura*, at New York.				
Middleton & Co.....	Trinidad	New York	1,800	1,800
AFRICANS.				
MARCH 24. By the S. S. *East Side*, at New York.				
Various	Bordeaux	New York	84,055	84,055
MARCH 25. By the S. S. *Roma*, at New York.				
Various	Marseilles	New York	460	460
APRIL 6. By the S. S. *Royal Prince*, at New York.				
Various	Havre	New York	252,582	252,582
APRIL 7. By the S. S. *Ascoda*, at New York.				
Poel & Kelly.....	Bordeaux	New York	211,031	
S. S. Pierce & Co.....	Bordeaux	Boston	482,658	
Rubber Importers & Dealers Co., Inc.....	Bordeaux	New York	134,400	
Various	.....	.....	874,520	1,702,609
APRIL 12. By the S. S. *Britannia*, at New York.				
Various	Marseilles	New York	311,580	311,580
GUTTA PERCHA.				
MARCH 27. By the S. S. *Arabian Prince*, at New York.				
Louis Windmuller & Roelker	Singapore	New York	1,500	1,500
APRIL 2. By the S. S. *Saxonia*, at New York.				
Various	London	New York	30,900	30,900
APRIL 13. By the S. S. *Remier*, at New York.				
Hadden & Co.....	Rouen	New York	46,200	46,200
APRIL 19. By the S. S. *Celtic Prince*, at New York.				
The United Malaysian Rubber Co., Limited..	Singapore	New York	55,729	55,729
APRIL 19. By the S. S. *Egremont Castle*, at New York.				
Various	Singapore	New York	42,600	42,600
GUTTA SIAK.				
MARCH 27. By the S. S. *Arabian Prince*, at New York.				
The United Malaysian Rubber Co., Limited..	Singapore	New York	100,800	100,800
APRIL 17. By the S. S. *Celtic Prince*, at New York.				
The United Malaysian Rubber Co., Limited..	Singapore	New York	67,200	
L. Littlejohn & Co., Inc.	Singapore	New York	8,600	75,800
APRIL 19. By the S. S. *Egremont Castle*, at New York.				
Various	Singapore	New York	37,800	37,800
GUTTAS.				
MARCH 25. By the S. S. *Anglo Egyptian*, at New York.				
Fred Stern & Co.....	London	New York	15,000	15,000
GUAYULE.				
MARCH 25. By Rail at Eagle Pass, Texas.				
Continental-Mexican Rubber Co.	Mexico	Akron	99,000	99,000
BALATA.				
APRIL 2. By the S. S. *Maraval*, at New York.				
Middleton & Co., Ltd...	Trinidad	New York	16,580	
General Export & Commission Co.	Trinidad	New York	10,800	27,380
APRIL 6. By the S. S. *Gen. G. W. Goethals*, at New York.				
Ultramares Corp.	Cristobal	New York	600	
Piza Nephews & Co.....	Cristobal	New York	2,700	3,300
APRIL 16. By the S. S. *Panama*, at New York.				
H. Marquardt & Co., Inc.	Cristobal	New York	9,750	9,750
APRIL 17. By the S. S. *Nickerie*, at New York.				
Arkell & Douglas, Inc...	Paramarito	New York	10,094	10,094
APRIL 19. By the S. S. *Matura*, at New York.				
Middleton & Co., Limited.	Trinidad	New York	2,942	2,942
PONTIANAK.				
MARCH 27. By the S. S. *Arabian Prince*, at New York.				
Borneo Sumatra Trading Co.	Singapore	New York	115,800	
The United Malaysian Rubber Co., Limited..	Singapore	New York	101,545	217,345
APRIL 7. By the S. S. *Meranke*, at New York.				
The United Malaysian Rubber Co., Limited..	Singapore	New York	77,100	77,100
APRIL 15. By the S. S. *Grace Dollar*, at New York.				
The United Malaysian Rubber Co., Limited..	Singapore	New York	366,905	366,905
APRIL 17. By the S. S. *Celtic Prince*, at New York.				
The United Malaysian Rubber Co., Limited..	Singapore	New York	225,000	
Fred Stern & Co	Singapore	New York	28,000	
L. Littlejohn & Co., Inc.	Singapore	New York	55,500	
Various	Singapore	New York	84,700	393,200
APRIL 19. By the S. S. *Egremont Castle* at New York.				
Various	Singapore	New York	55,500	55,500

THE FUTURE OF THE RUBBER MARKET.

W. H. RICKINSON & SON, of London, supply the following information to assist those who are desirous of making a forecast of the world's future production and consumption of crude rubber:

Taking the actual world's consumption of rubber during 1919 at 320,000 tons, an annual increase of 15 per cent would raise the demand to 643,634 tons in 1924. To meet this, plantation estates would have to yield an average of between 450 and 475 pounds per acre (see Table C).

Consumption of rubber in the United States has shown an average annual increase of 27.7 per cent during the past ten years (see Table F).

The increased demand for rubber in the United States during the war was mainly for home consumption.

Should an increasing world demand be maintained at about 25 per cent per annum, it would necessitate a yield from the whole planted area in bearing of 716 pounds per acre to meet it. It takes a shorter period to increase output on estates from 200 pounds to 300 pounds per acre, than from 300 pounds to 400 pounds.

Most of the rubber produced is used for the manufacture of tires, and if this demand is maintained during the next few years there will not be enough rubber available, as only the present planted area (2,910,750 acres) will be tappable during the next five years.

The average production during the last five years from Brazil has been 35,171 tons, and of wild rubber for the same period 10,197 tons.

The central European countries were large consumers before the war and during the next few years their requirements will no doubt be renewed on an increasing scale.

The largest tire manufacturer in the world—an American concern—contemplates increasing its output this year by 30 per cent over 1919.

As far as can be judged at the present time the years 1921-1923 will be as interesting for the rubber industry as were the years 1909-1911.

PLANTATION PRODUCTION.

Table A.

ACTUAL.

	Acres in Bearing.	Tons.	Pounds Per Acre in Bearing.	Annual Increase of Area in Bearing.
1910	116,500	8,200	= 157	—
1911	294,200	14,419	= 109	139.6%
1912	506,550	28,518	= 126	72.1%
1913	687,350	47,618	= 155	35.6%
1914	861,150	71,380	= 185	25.3%
1915	1,122,550	107,867	= 215	30.3%
1916	1,505,350	152,650	= 227	34.1%
1917	1,817,350	213,070	= 262	20.7%
1918	2,021,750	255,950	= 283	11.2%
1919	2,181,050	285,225	= 293	7.8%

Table B.

FOR ESTIMATING.

This table is intended to assist in arriving at a forecast of the Plantation production for the years 1920-1924 inclusive, according to the pounds per planted acre in bearing assumed to be yielded and indicated in the figures at the head of each column.

Pounds Per Acre.	350.	375.	400.	425.	450.	475.	500.	550.	600.	Acres in Bearing.	
1920	358,399	383,998	409,598	435,198	460,798	486,398	511,997	563,196	614,397	2,293,750	5.2%
1921	384,211	411,635	439,098	466,541	493,985	521,429	548,872	603,759	658,647	2,458,950	7.2%
1922	408,023	437,168	466,312	495,456	524,601	553,746	582,890	641,179	699,468	2,611,350	6.2%
1923	431,242	462,045	492,848	523,651	554,454	585,257	616,060	677,666	739,272	2,759,950	5.6%
1924	454,804	487,290	519,776	552,262	584,748	617,234	649,720	714,692	779,664	2,910,750	5.4%
	—	7.1%	6.6%	6.2%	5.8%	5.6%	5.2%	10%	9%	Percentage of Increase.	

Table C.
WORLD'S PRODUCTION.

45,000 tons are here apportioned annually for rubber other than plantation grown, i.e., 35,000 tons as coming from Brazil and 10,000 tons of wild rubber as coming from Africa, Central America, Mexico and other parts of the world. These quantities are added to the figures in Table B, and the results found in the columns below indicate the world's total production according to the pounds per planted acre in bearing assumed to be yielded by the plantations.

	*350	*375	*400	*425	*450	*475	*500	*550	*600
1920 ..... tons	403,399	428,998	454,598	480,198	505,798	531,398	556,997	608,196	659,397
1921	429,211	456,635	484,098	511,541	538,985	566,429	593,872	648,759	703,647
1922	453,023	482,168	511,312	540,456	569,601	598,746	627,890	686,179	744,468
1923	476,242	507,045	537,848	568,651	599,454	630,257	661,060	722,666	784,272
1924	499,804	532,290	564,776	597,262	629,748	662,234	694,720	759,692	824,664

*Pounds per acre yield of plantation rubber in bearing.

Table D.
WORLD'S CONSUMPTION.
(On the basis of an actual consumption of 320,000 tons in 1919.)

PERCENTAGE OF ANNUAL INCREASE.	5%	10%	15%	20%	25%	30%	35%	40%
1920 ..... tons	336,000	352,000	368,000	384,000	400,000	416,000	432,000	448,000
1921	352,800	387,200	423,200	460,800	500,000	540,800	583,200	627,200
1922	370,440	425,920	486,680	552,960	625,000	703,040	787,320	882,080
1923	388,962	468,512	559,682	663,552	781,250	913,952	1,062,882	1,234,912
1924	408,410	515,363	643,634	796,262	976,562	1,188,137	1,434,892	1,728,876

Table E.
DISTRIBUTION DURING 1913-19.

	1913.	1914.	1915.	1916.	1917.	1918.	1919.
America ..... tons	49,851	61,249	96,792	116,475	177,088	142,772	217,000
Great Britain	18,640	18,000	15,072	26,760	25,983	30,104	42,520
Russia	9,000	11,610	10,000	7,500	7,500	2,000	1,500
Germany }		13,400	6,000	3,600	3,000	1,000	4,000
Austria }	18,500						
France	6,500	5,000	10,770	14,000	17,000	18,000	22,000
Italy, etc.	2,000	4,000	6,500	9,000	9,000	9,800	14,000
Scandinavia	1,500	2,400	6,568	4,525	5,323	5,000	7,000
Japan }							
Australia }	1,300	2,400	2,500	4,500	4,500	7,400	12,000
Canada	2,000	1,700	4,500	4,000	6,287	8,300	9,500
Belgium	3,000	630	.....	.....	.....	.....	5,000
Totals	112,291	120,380	158,702	189,760	255,675	224,376	334,520

Table F.
UNITED STATES OF AMERICA.

	1918.			1919.		
	IMPORTS.	EXPORTS.	RETAINED.	IMPORTS.	EXPORTS.	RETAINED.
January	11,293	569	10,724	10,285	85	10,200
February	13,177	183	12,994	14,958	135	14,823
March	12,433	465	11,968	28,857	180	28,677
April	14,738	427	14,311	27,574	193	27,381
May	21,961	402	21,559	24,767	167	24,600
June	15,038	309	14,729	16,354	169	16,185
July	18,062	135	17,927	23,499	195	23,304
August	9,583	102	9,481	10,027	113	9,914
September	9,179	33	9,146	13,747	225	13,522
October	6,795	44	6,751	19,520	285	19,235
November	6,773	53	6,720	15,674	134	15,540*
December	6,485	23	6,462	13,830	211	13,619*
Totals	145,517	2,745	145,772	219,092	2,092	217,000

*Estimated.

RUBBER RETAINED (IN TONS).

		Increase (+) or Decrease (—). (In tons.)	(Percentage.)
1910	31,576	—	—
1911	29,235	— 2,341	— 7.4
1912	50,248	+21,013	+71.8
1913	49,851	— 397	— .8
1914	61,249	+11,398	+22.8
1915	96,792	+35,543	+58.0
1916	116,475	+19,633	+20.3
1917	177,088	+60,613	+52.0
1918	†142,772	—35,571	—19.3
1919	*217,000	+74,228	+51.9

The average increase for the above ten years has been 27.7 per cent per annum.

†Owing to shortage of shipping facilities.
*Partly estimated.

Table G.
RETAINED MONTHLY BY THE UNITED STATES AND BY GREAT BRITAIN.

	1918.				1919.			
			Plantation Price per lb.—shillings.				Plantation Price per lb.—shillings.	
	United States.	Great Britain.	Highest.	Lowest.	United States.	Great Britain.	Highest.	Lowest.
January ..... tons	10,724	6,489	2/6¼	2/2¾	10,200	4,232	2/ 2¾	2/ 0
February	12,994	4,400	2/5	2/3	14,823	2,853	2/ 1¾	2/ 0¼
March	11,968	901	2/6¾	2/4¾	28,677	3,625	2/ 1¾	2/ 0
April	14,311	3,922	2/6½	2/4	27,381	12,030	2/ 0¼	1/10½
May	21,559	2,143	2/4¾	2/2	24,600	6,301	1/11½	1/10½
June	14,729	969	2/3	2/1	16,185	6,066	1/10½	1/ 7
July	17,927	2,773	2/3	2/1½	23,304	4,296	1/11¾	1/ 9¼
August	9,481	1,154	2/2	2/1	9,914	225	2/ 1½	1/11
September	9,146	2,896	2/3	2/1½	13,522	1,433	2/ 4¾	2/ 1½
October	6,751	786	2/5½	2/2½	19,235	384	2/ 4¾	2/ 2¼
November	6,720	2,984	2/6	2/4½	*15,540	-401	2/ 6	2/ 4½
December	6,462	4,973	2/4¼	2/2½	*13,619	1,476	2/11	2/ 5½
Total	142,772	30,104	Average	2/3½	217,000	42,520	Average	2/ 1¼

The United States of America consume about 60 per cent of the world's total rubber production. Whenever the supply exceeds the demand, Great Britain is the "dumping ground," and the price of rubber is affected accordingly.

*Estimated.

Table H.
FLUCTUATIONS, ETC., IN THE PRICE DURING 1909-19.
PLANTATION (Best Crêpe).

	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.
Highest ..... shillings	9/3	12/9	7/3	5/9	4/6½	3/0	4/1½	4/3½	3/4½	2/6¾	2/11
Lowest	5/3	5/7	4/6	4/1	2/0	1/11½	1/11¾	2/1¾	2/2¾	2/1	1/7
Average	7/1	8/9	5/5½	4/9	3/0¼	2/3½	2/6	2/10¼	2/9¾	2/3½	2/1¼

PARA (Fine Hard) RUBBER.

	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.
Highest ..... shillings	9/1½	12/6½	7/2	5/2½	4/7	3/2¾	3/8½	4/1	3/5	3/8	2/8
Lowest	5/0	5/10	3/10	4/3	3/0½	2/6	2/4½	2/7¼	2/5½	2/7	2/4¼
Average	6/11	8/10	5/0	4/10	3/8	2/10½	2/7	3/1½	3/1¾	2/11½	2/5½

The foregoing statistics should be of assistance in forming an idea as to whether or not the future will bring a shortage in the world's rubber production.

RUBBER STATISTICS FOR ITALY.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Ten Months Ended October 31.			
	1918.		1919.	
UNMANUFACTURED—	Quintals.[1]	Lire.[2]	Quintals.	Lire.
India rubber and gutta percha—				
raw and reclaimed:				
From Great Britain	7,155		132	
Straits Settlements	26,875		42,376	
British India and Ceylon	5,760		24,267	
French African Colonies	4,993	65,474,850	3,282	103,405,050
Belgian Congo	251		825	
Brazil	14,468		26,218	
Other countries	2,885		1,381	
Rubber scrap	1,841	331,380	14,790	2,646,000
Totals, unmanufactured	**64,198**	**65,806,230**	**113,271**	**106,051,050**
MANUFACTURED—				
India rubber and gutta percha—				
Threads	589	1,531,400	188	488,800
Sheets, including hard rubber	118	342,600	213	197,200
Tubes:				
Inner tubes	4	10,400	9	23,400
Hose	104	135,200	155	201,500
Other forms	2	2,400	22	26,400
Belting	455	637,000	450	630,000
Rubber coated fabrics—*pieces*:				
For carding combs	216	345,600	337	539,200
Other forms	9	13,500	98	147,000
Boots and shoes.....*pairs*	31,510	472,650	42,030	630,450
Elastic webbing	194	543,000	290	812,000
Clothing and articles for travel	15	48,000	4	12,800
Manufactures of india rubber and gutta percha, n. e. s.:				
From cut sheets	28	78,400	33	92,400
Elastic fabric	1,259	2,140,300	3,395	5,771,500
Tires and tubes:				
From France	2,201		3,634	
Great Britain	446	6,355,000	971	11,275,200
Other countries	1		93	
Other rubber manufactures:				
From France	1,830		237	
Great Britain	2,661		9,043	
United States	223	7,075,500	154	14,157,000
Other countries	3		4	
Totals, manufactured	.....	**19,730,950**	.....	**35,004,850**
Total imports	.....	**85,537,180**	.....	**141,055,900**

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—	Quintals.	Lire.	Quintals.	Lire.
India rubber and gutta percha—				
raw and reclaimed:				
To Spain	1,394		2,122	
United States	1,134	1,011,200	2,078	1,680,400
Other countries	.....		1	
Rubber scrap	.....	.....	4,060	.....
Totals, unmanufctd.	2,528	1,011,200	8,261	1,680,400
MANUFACTURED—				
India rubber and gutta percha—				
Threads	59	159,300	431	1,163,700
Sheets, including hard rubber	69	112,100	80	147,900
Tubes:				
Inner tubes	19	49,400	50	130,000
Hose	197	236,400	325	390,000
Other forms	108	118,800	373	410,300
Belting	87	139,200	95	152,000
Rubber coated fabrics *pieces*	46	55,200	232	278,400
Boots and shoes.....*pairs*	.....	.....	64	960
Elastic Goods	969	2,907,000	741	2,223,000
Waterproofed goods	8	38,400	27	129,600
Tires and tubes:				
To France	2,900		75	
Great Britain	1,773		4,400	
Spain	82		608	
Switzerland	2		1,614	
British Isles and Ceylon	291		907	
Dutch East Indies	441	13,186,000	241	22,528,500
Straits Settlements	.....		176	
Australia	95		507	
Argentina	221		1,065	
Brazil	529		895	
Other countries	606		3,815	
Other rubber manufactures:				
To France	253		320	
Great Britain	112		122	
Spain	13		30	
Switzerland	153		259	
Egypt	30	1,541,400	33	4,969,400
Argentina	168		266	
Brazil	61		83	
Uruguay	14		54	
Other countries	227		2,321	
Totals manufactured.	.....	18,543,200	.....	32,523,760
Total exports	.....	**19,554,400**	.....	**34,691,360**

[1] One quintal equals 220.46 pounds.
[2] One lire equals $0.193.

UNITED KINGDOM RUBBER STATISTICS.

IMPORTS.

	February.			
	1919.		1920.	
UNMANUFACTURED—	Pounds.	Value.	Pounds.	Value.
Crude rubber:				
From—				
Straits Settlements	2,899,800	£307,519	6,252,100	£793,729
Federated Malay States	2,647,400	308,953	7,557,000	936,944
British India	926,400	106,344	1,224,500	154,368
Ceylon and dependencies	3,509,700	385,537	4,105,500	506,041
Other Dutch possessions in Indian Seas	766,900	88,027	949,900	506,041
Dutch East Indies (except other Dutch possessions in Indian Seas)	.....	.....	735,900	122,439
Other countries in East Indies and Pacific, not elsewhere specified	204,700	24,258	397,500	49,582
Brazil	2,036,900	232,667	3,400	300
Peru	194,900	21,405	.....	.....
South and Central America (except Brazil and Peru)	.....	.....	36,100	4,034
West Africa:				
French West Africa	.....	.....	12,300	1,342
Gold Coast	14,200	784	3,300	240
Other parts of West Africa	171,100	15,529	198,600	14,870
East Africa, including Madagascar	102,500	12,243	17,600	2,045
Other countries	154,400	12,813	115,800	13,990
Totals	13,628,900	£1,516,074	21,608,600	£2,699,027
Waste and reclaimed rubber	242,600	8,135	1,206,900	18,857
Totals, unmanufactured	13,871,500	£1,524,209	22,815,500	£2,717,884
*Rubber substitutes	.....	.....	76,900	3,012
Gutta percha and balata	882,800	134,753	849,400	153,513

*Included in "Other Articles," Class III, T., prior to 1920.

MANUFACTURED—				
Boots and shoes..*dozen pairs*	3,749	£6,592	19,035	£44,045
Waterproofed clothing	.....	6	.....	1,620
Insulated wire	.....	11	.....	965
Tires and tubes	.....	79,650	.....	496,511
Other rubber manufactures	.....	44,637	.....	53,985
Totals	.....	£120,896	.....	£597,126

EXPORTS.

UNMANUFACTURED—				
Waste and reclaimed rubber	300,800	£7,464	751,800	£24,573
Rubber substitutes	.....	.....	236,500	11,233
Totals	300,800	7,464	988,300	35,796
MANUFACTURED—				
Boots and shoes..*dozen pairs*	10,456	13,713	15,017	31,577
Waterproofed clothing	.....	67,175	.....	199,560
Insulated wire	.....	27,389	.....	100,130
Submarine cables	.....	39,618	.....	39,814
Tires and tubes	.....	164,741	.....	445,099
Other rubber manufactures	.....	130,989	.....	294,292
Totals	.....	414,225	.....	1,110,472

EXPORTS—FOREIGN AND COLONIAL.

UNMANUFACTURED—	Pounds.	Value.	Pounds.	Value.
Crude rubber:				
To Belgium	62,600	£6,747	720,100	£82,657
France	1,906,400	209,459	1,800,900	239,870
Germany	.....	.....	226,100	26,061
Italy	695,300	84,220	559,300	72,521
Russia	.....	.....	34,000	4,255
Spain	4,600	575	6,500	750
Sweden, Norway and Denmark	400,700	55,363	201,000	24,094
Other European countries	9,000	1,094	85,300	11,000
United States	4,045,300	404,788	7,611,500	983,670
Canada	46,200	4,057	638,100	82,708
Other countries	67,300	11,048	138,700	16,345
Totals, rubber	7,237,400	777,351	12,021,500	1,543,931
Waste and reclaimed	.....	.....	18,800	425
Rubber substitutes	.....	.....	3,100	140
Gutta percha balata	17,800	3,672	95,100	19,282
Totals, unmanufactured	.....	781,023	.....	1,563,778
MANUFACTURED—				
Boots and shoes..*dozen pairs*	.....	.....	4	48
Tires and tubes	.....	9,450	.....	4,741
Waterproof clothing	.....	.....	.....	12
Insulated wire	.....	5,174	.....	.....
Other rubber manufactures	.....	2,580	.....	2,714
Total	.....	17,204	.....	7,515

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF FEBRUARY, 1920.

EXPORTED TO—	Belting. Value.	Hose. Value.	Packing. Value.	Boots. Pairs.	Boots. Value.	Shoes. Pairs.	Shoes. Value.	Soles and Heels. Value.	Automobile Tires. Casings. Value.	Automobile Tires. Inner Tubes. Value.	Automobile Tires. Solid Tires. Value.	Automobile Tires. All Others. Value.	Insulated Wire and Cables. Value.	Druggists' Rubber Sundries. Value.	All Other Manufactures of Rubber. Value.	Totals. Value.
EUROPE:																
Austria	.....	$3,334	.....	11,865	$59,870	.....	.....	.....	$6,614	.....	$10,000	.....	.....	.....	.....	$79,818
Azores and Madeira Islands	.....	.....	.....	.....	.....	.....	.....	$77	.....	.....	.....	.....	.....	$38	.....	115
Belgium	$87	.....	$82	.....	.....	6,820	$4,351	127	90,465	$7,974	8,254	$530	$1,917	.....	$14,611	128,398
Bulgaria	.....	.....	.....	.....	.....	.....	.....	.....	485	.....	.....	.....	.....	.....	13	498
Denmark	666	99	980	503	2,510	71,650	73,516	1,658	125,391	8,880	2,449	3,855	7,244	3,105	23,699	254,052
Finland	.....	282	1,150	.....	.....	85,110	64,912	.....	8,330	115	.....	.....	236	.....	1,260	76,285
France	4,589	159	726	.....	.....	54,982	30,780	10	248,044	6,257	.....	3,127	1,238	5,882	33,554	334,366
Germany	251	332	.....	.....	.....	11,877	21,702	22	47,540	159	.....	28	.....	205	4,522	74,761
Greece	.....	991	40	60	165	672	370	120	19,573	932	.....	.....	1,291	.....	1,183	24,665
Italy	.....	271	.....	.....	.....	12,085	10,436	26	231,184	3,282	1,386	360	124	459	1,859	249,327
Malta, Gozo, and Cyprus Islands	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	.....	.....	.....	.....	.....	10
Netherlands	1,373	1,249	501	.....	.....	4,101	3,930	120	180,840	4,166	18,201	49	22,205	3,198	4,090	239,922
Norway	1,561	9,129	611	3,797	8,274	192,504	137,552	502	71,708	6,219	17,967	.....	18,057	.....	6,572	278,152
Portugal	.....	.....	.....	.....	.....	600	484	.....	20,558	.....	.....	.....	.....	.....	57	21,099
Roumania	336	.....	22	.....	.....	12,846	14,409	.....	189,934	401	.....	.....	403	.....	1,064	206,569
Spain	.....	.....	205	.....	.....	29,333	22,434	6,447	223,807	2,565	8,456	4,130	1,383	1,975	12,127	283,529
Sweden	5,337	3,040	1,448	.....	.....	2,431	2,250	7	196,617	12,720	14,274	48	220	.....	3,598	239,529
Switzerland	.....	360	.....	.....	.....	27,373	18,845	.....	60,886	1,166	222	.....	3,507	655	4,937	90,578
Turkey in Europe	.....	27	.....	6,228	18,650	53,262	81,827	.....	35,390	.....	6,388	.....	.....	.....	15	142,297
England	6,500	97,336	22,747	5,052	5,164	209,074	169,722	13,339	349,947	26,145	15,929	10,595	18,884	19,775	127,009	883,092
Scotland	.....	12	375	.....	.....	25,136	16,447	.....	5,757	.....	.....	.....	.....	.....	1,865	24,456
Ireland	.....	.....	.....	.....	.....	.....	.....	.....	1,040	.....	.....	.....	.....	.....	.....	1,040
Poland and Danzig	.....	.....	.....	.....	.....	2,000	2,385	.....	.....	.....	.....	.....	.....	.....	.....	2,385
Yugoslavia	.....	.....	.....	.....	.....	.....	.....	.....	1,383	.....	.....	.....	.....	.....	.....	1,383
TOTALS, EUROPE	$20,700	$116,621	$28,887	27,505	$94,633	801,856	$676,352	$22,455	$2,115,493	$80,991	$103,526	$22,662	$76,709	$35,292	$242,035	$3,636,356
NORTH AMERICA:																
Bermuda	.....	.....	$76	5	$24	36	$34	$273	.....	.....	.....	$48	.....	$10	$337	$802
British Honduras	.....	$37	.....	.....	.....	.....	.....	384	$788	$263	.....	.....	$57	.....	188	1,717
Canada	$21,184	10,397	7,178	1,989	7,474	4,328	8,243	463	179,597	22,099	$14,326	520	16,173	22,312	167,513	477,479
Costa Rica	839	419	248	.....	.....	.....	.....	104	710	322	.....	351	520	19	373	3,905
Guatemala	937	110	223	.....	.....	544	801	600	4,465	860	.....	.....	3,362	447	1,564	13,369
Honduras	166	336	463	.....	.....	.....	.....	484	2,728	51	.....	.....	929	.....	374	5,531
Nicaragua	1,281	322	313	.....	.....	.....	.....	2,040	3,732	.....	.....	.....	388	174	117	8,367
Panama	78	10,730	2,679	90	276	3,742	2,707	370	28,277	2,227	3,387	7,030	4,987	847	3,607	67,202
Salvador	1,111	338	56	.....	.....	.....	.....	3,010	5,108	680	3,258	.....	36	110	672	14,379
Mexico	39,146	17,316	6,812	34	197	6,225	7,346	4,073	49,801	5,023	7,761	2,845	26,858	9,714	23,534	200,426
Newfoundland and Labrador	454	23	.....	2,629	9,832	2,315	2,150	76	89	12	.....	.....	236	.....	685	13,557
Barbados	5	.....	.....	.....	.....	370	419	31	1,309	178	40	.....	151	24	209	2,366
Jamaica	30	136	.....	.....	.....	.....	.....	958	16,174	1,262	1,814	15	127	102	622	21,240
Trinidad and Tobago	78	1,336	329	.....	.....	496	192	369	8,488	1,090	276	77	482	845	463	14,025
Other British West Indies	67	28	106	.....	.....	483	611	25	1,522	15	.....	6	105	41	67	2,593
Cuba	16,021	31,385	16,152	.....	.....	36,498	28,964	15,659	117,820	16,264	30,752	6,960	68,336	11,324	23,908	383,545
Danish West Indies	.....	.....	60	.....	.....	201	202	304	1,331	306	632	.....	59	.....	47	2,941
Dutch West Indies	.....	242	.....	.....	.....	48	35	57	1,406	38	.....	.....	.....	49	293	2,120
French West Indies	.....	166	.....	.....	.....	.....	.....	.....	9,960	1,218	657	35	58	479	6	12,579
Haiti	142	37	18	.....	.....	.....	.....	61	2,902	235	1,713	200	1,023	6	436	6,773
Dominican Republic	302	358	956	.....	.....	17	26	55	8,762	1,355	275	360	2,196	222	1,632	16,499
TOTALS, NORTH AMERICA	$81,841	$73,716	$35,669	4,747	$17,803	55,303	$51,730	$29,396	$444,969	$53,498	$64,891	$18,447	$126,083	$46,725	$226,647	$1,271,415
SOUTH AMERICA:																
Argentina	$4,806	$13,590	$480	66	$308	10,090	$7,990	$1,308	$233,283	$3,747	$2,035	$1,651	$28,565	$2,334	$15,084	$315,181
Bolivia	65	.....	.....	.....	.....	.....	.....	.....	3,383	207	712	.....	45	172	16	4,600
Brazil	8,903	16,737	2,970	.....	.....	40,352	34,010	4,111	140,216	24,316	279	417	242,770	7,450	22,716	504,895
Chile	2,164	3,448	285	.....	.....	11,508	7,398	.....	44,832	527	6,838	15	6,494	2,532	7,435	81,968
Colombia	1,788	915	1,125	.....	.....	2,303	2,535	195	17,455	377	173	.....	6,752	10,011	2,188	43,514
Ecuador	.....	344	.....	.....	.....	2,280	1,644	.....	3,270	86	.....	378	680	7	920	7,329
British Guiana	.....	.....	.....	.....	.....	90	64	.....	3,583	2,962	730	.....	50	.....	113	7,502
Dutch Guiana	.....	.....	.....	.....	.....	48	29	.....	567	11	290	.....	330	10	937	2,174
Paraguay	.....	.....	.....	.....	.....	.....	.....	.....	.....	93	.....	.....	38	180	178	489
Peru	862	9,897	582	.....	.....	21	34	135	12,822	497	.....	211	11,125	229	8,684	45,078
Uruguay	1,237	1,848	.....	.....	.....	1,774	1,728	.....	51,952	720	.....	.....	3,014	899	7,541	68,939
Venezuela	1,684	928	465	.....	.....	.....	.....	910	26,621	2,775	765	244	1,951	4,511	4,623	45,477
TOTALS, SOUTH AMERICA	$21,509	$47,707	$5,907	66	$308	68,466	$55,432	$6,659	$537,984	$36,318	$11,822	$2,916	$301,814	$28,335	$70,435	$1,127,146
OCEANIA:																
Australia	.....	$1,209	$6,371	366	$1,451	12,459	$7,319	$291	$87,323	$3,423	$341	$10,518	$1,266	$982	$8,105	$128,599
New Zealand	$4,365	2,809	1,482	6,120	21,012	1,768	1,779	1,446	200,786	10,577	7,560	1,316	5,743	2,703	9,499	271,077
Other British Oceania	.....	60	.....	.....	.....	.....	.....	.....	1,652	42	.....	230	.....	78	20	2,082
French Oceania	113	1,051	25	2	16	.....	.....	10	968	206	348	1,028	25	15	166	3,971
Other Oceania	.....	.....	.....	.....	.....	.....	.....	.....	1,613	.....	311	.....	25	.....	30	1,979
Philippine Islands	1,238	3,067	1,522	7	25	216	164	1,233	31,609	8,437	3,650	383	6,519	340	13,487	71,674
TOTALS, OCEANIA	$5,716	$8,196	$9,400	6,495	$22,504	14,443	$9,262	$2,980	$323,951	$22,685	$12,210	$13,475	$13,578	$4,118	$31,307	$479,382

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES.

EXPORTED TO—	Belting. Value.	Hose. Value.	Packing. Value.	Boots. Pairs.	Boots. Value.	Shoes. Pairs.	Shoes. Value.	Soles and Heels. Value.	Automobile Tires. Casings. Value.	Automobile Tires. Inner Tubes. Value.	Automobile Tires. Solid Tires. Value.	Automobile Tires. All Others. Value.	Insulated Wire and Cables. Value.	Druggists' Rubber Sundries. Value.	All Other Manufactures of Rubber. Value.	Totals. Value.
ASIA:																
Aden	.....	.....	.....	.....	.....	.....	.....	.....	$2,860	.....	.....	.....	.....	.....	.....	$2,860
China	$147	$1,611	$30	6,077	$6,939	.....	.....	.....	1,232	$24	$5,300	$50	$14,862	$234	$3,542	33,971
Kwangtung	.....	.....	.....	600	554	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	554
Chosen	.....	.....	.....	.....	.....	.....	.....	.....	302	.....	.....	.....	.....	.....	15	317
British India	219	4,504	2,371	1	3	1,263	1,402	.....	57,038	4,426	4,136	14	14,608	1,254	9,117	99,492
Straits Settlements	.....	.....	.....	1	.....	520	591	.....	53,966	3,290	1,086	.....	.....	.....	1,825	60,758
Other British East Indies	.....	.....	.....	.....	.....	264	272	.....	287	23	.....	.....	.....	30	197	809
Dutch East Indies	1,973	2,412	.....	.....	.....	.....	.....	$329	48,646	2,926	5,589	.....	728	299	5,148	68,050
French East Indies	.....	.....	.....	.....	.....	.....	.....	.....	175	32	.....	.....	.....	.....	25	232
Hongkong	.....	.....	311	.....	.....	120	300	.....	4,279	.....	.....	.....	11,393	139	243	16,665
Japan	1,344	3,214	12,594	972	3,395	16,727	18,439	.....	41,297	5,514	3,508	13	3,363	759	15,056	108,496
Russia in Asia	8	418	.....	24	39	43,657	35,881	.....	17,474	.....	.....	.....	.....	1,366	.....	55,186
Siam	.....	.....	.....	.....	.....	.....	.....	.....	4,507	.....	.....	.....	.....	.....	.....	4,507
Turkey in Asia	401	789	.....	.....	.....	4,380	3,737	.....	2,326	846	.....	.....	.....	.....	324	8,423
TOTALS, ASIA	$4,092	$13,348	$15,306	997	$3,437	73,608	$68,115	$329	$234,389	$17,081	$19,619	$77	$44,954	$4,081	$35,492	$460,320
AFRICA:																
Belgian Congo	.....	.....	.....	.....	.....	.....	.....	.....	.....	$216	$577	.....	$89	.....	.....	$89
British West Africa	.....	$1,362	.....	1	$5	.....	.....	.....	$93,596	3,465	.....	.....	35	.....	.....	95,791
British South Africa	$36,339	9,275	$9,407	122	534	6,235	$5,544	$2,629	81,432	.....	.....	$490	3,702	$2,445	$3,572	158,834
British East Africa	102	.....	.....	.....	.....	.....	.....	.....	5,106	.....	.....	.....	55	.....	.....	5,263
Canary Islands	.....	26	.....	.....	.....	.....	.....	.....	3,392	.....	.....	.....	.....	.....	55	3,473
French Africa	.....	.....	.....	.....	.....	.....	.....	.....	5,733	57	.....	.....	.....	.....	.....	5,790
German Africa	.....	.....	.....	.....	.....	.....	.....	.....	389	.....	.....	.....	.....	.....	32	421
Liberia	.....	.....	.....	.....	.....	48	48	.....	2,661	.....	.....	.....	.....	.....	.....	2,709
Morocco	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	886	.....	.....	41	.....	927
Portuguese Africa	.....	.....	471	.....	.....	.....	.....	.....	.....	.....	421	.....	.....	13	198	1,103
Egypt	.....	2,097	.....	.....	.....	.....	.....	400	611	.....	.....	17	.....	350	474	1,852
TOTALS, AFRICA	$36,441	$12,760	$9,878	123	$539	6,283	$5,592	$3,029	$192,920	$3,738	$1,884	$490	$3,898	$2,849	$4,331	$278,349
GRAND TOTALS	$170,299	$272,348	$105,047	39,933	$139,224	1,019,959	$866,483	$64,848	$3,849,706	$214,311	$213,952	$58,067	$567,036	$121,400	$610,247	$7,252,968

EXPORTED TO—	Boots and Shoes. Pairs.	Boots and Shoes. Value.	Automobile Tires. Value.	All Others. Value.	Totals. Value.
Hawaii	.....	.....	$44,259	$502	.....
Porto Rico	.....	.....	47,318	7,539	.....
TOTALS	.....	.....	$91,577	$8,041	$142,019

EXPORTED TO—	Belting, Hose, and Packing. Value.	Insulated Wire and Cables. Value.	Druggists' Rubber Sundries. Value.	All Other Manufactures of Rubber. Value.	Totals. Value.
Hawaii	$7,031	.....	.....	$4,902	.....
Porto Rico	9,080	.....	.....	21,388	.....
TOTALS	$16,111	.....	.....	$26,290	$142,019

(Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.)

EXPORTS OF DRUGGISTS' RUBBER SUNDRIES[1] FROM THE UNITED STATES BY COUNTRIES DURING THE MONTH OF JANUARY, 1920.

EXPORTED TO— EUROPE:	Value.
Denmark	$2,649
France	1,592
Germany	793
Italy	266
Netherlands	6,130
Norway	338
Portugal	53
Spain	198
Sweden	1,646
England	6,144
TOTALS, EUROPE	$19,809
NORTH AMERICA:	
Bermuda	$ 29
British Honduras	37
Canada	21,664
Costa Rica	133
Guatemala	3,683
Honduras	59
Nicaragua	258
Panama	1,047
Salvador	93
Mexico	4,729
Barbados	30
Jamaica	142
Trinidad and Tobago	241
Other British West Indies	61
Cuba	8,813
Haiti	59
Dominican Republic	1,889
TOTALS, NORTH AMERIC(	$42,967

EXPORTED TO— SOUTH AMERICA:	Value.
Argentina	$ 716
Bolivia	432
Brazil	3,579
Chile	3,104
Colombia	1,384
Ecuador	984
Peru	530
Uruguay	111
Venezuela	886
TOTALS, SOUTH AMERICA	$11,726
OCEANIA:	
Australia	$2,760
New Zealand	1,472
Philippine Islands	894
TOTALS, OCEANIA	$5,126
ASIA:	
China	$1,406
British India	50
Straits Settlements	88
Other British East Indies	12
Dutch East Indies	25
Hongkong	164
Japan	8,262
Siam	166
TOTALS, ASIA	$10,173
AFRICA:	
British South Africa	$212
Egypt	132
TOTALS, AFRICA	$344
TOTAL	$90,145

[1] Details of exports of other domestic merchandise by countries during January were given on pages 470-471, in our issue of April 1, 1920. *(Compiled by the Bureau of Foreign and Domestic Commerce.)*

RUBBER STATISTICS FOR THE DOMINION OF CANADA.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	January. 1919. Pounds.	1919. Value.	1920. Pounds.	1920. Value.
UNMANUFACTURED—*free:*				
Rubber, gutta percha, etc:				
From United Kingdom	223	$231	855,876	$478,333
United States	117,266	59,143	859,030	413,566
British East Indies:				
Ceylon	195,190	57,058	.....	.....
Straits Settlements	852,790	282,934	532,437	275,751
New Zealand	24,400	14,780	.....	.....
Other countries	11,129	3,895	2,421	997
Totals	1,200,997	$418,041	2,249,764	$1,168,647
Rubber recovered	317,081	52,589	165,197	27,836
Rubber scrap	568,135	63,705	105,582	11,376
Balata	1,051	998	.....	.....
Totals, unmanufactured	2,087,264	$535,333	2,520,543	$1,207,859
PARTLY MANUFACTURED:				
Hard rubber sheets and rods	1,231	$1,116	6,741	$6,266
Hard rubber tubes	.....	1,897	.....	3,720
Rubber thread not covered	8,615	12,872	5,683	8,382
Totals, partly manufactured	9,846	$15,885	12,424	$18,368
MANUFACTURED:				
Belting	.....	$9,043	.....	$12,218
Hose	.....	8,355	.....	7,963
Packing	.....	12,275	.....	7,254
Boots and shoes	.....	9,680	.....	28,765
Clothing, including waterproofed	.....	7,646	.....	23,570
Gloves	.....	.....	.....	933
Hot water bottles	.....	.....	.....	3,077
Mats and matting	.....	213	.....	465
Tires, solid	.....		.....	29,636
Tires, pneumatic	.....	16,100	.....	61,466
Tires, inner tubes	.....		.....	889
Other kinds	.....		.....	.....
Rubber cement	.....	.....	.....	5,986
Other manufactures	.....	124,378	.....	116,740
Totals, manufactured	.....	$187,690	.....	$298,962
Totals, rubber imports	.....	$738,896	.....	$1,525,189
Insulated wire and cables:				
Wire and cables, covered with cotton, linen, silk, rubber, etc	8,479	.....	13,857	.....
Copper wire and cables, covered as above	*	.....	17,643	$33,788
Rubber substitutes	147,924	12,866	183,429	21,755
Chicle	192,324	133,171	31,426	9,222

*Included in "Wire and Cables."

DOMINION OF CANADA RUBBER STATISTICS—(Continued).
EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

January.

	1919.		1920.	
UNMANUFACTURED:	Produce of Canada. Value.	Reexports of Foreign Goods. Value.	Produce of Canada. Value.	Reexports of Foreign Goods. Value.
Crude and waste rubber..	$20,189	.....	$19,989	$53
MANUFACTURED:				
Belting	$829	.....	$256	.....
Hose	3,440	.....	26,858	.....
Boots and shoes	24,522	.....	238,708	$270
Clothing, including waterproofed	156	$15,035	2,194	.....
Tires, pneumatic	.....		891,728	
Tires, other kinds	175,809	427	21,437	8,963
Other manufacturers	2,555	8,218	21,842	4,067
Totals, manufactured..	$207,311	$23,680	$1,203,023	$13,302
Totals, rubber exports.	$227,500	$23,680	$1,223,012	$13,355
Insulated wire and cable.	.....	.....	$33,788	.....
Chicle	.....	.....	108,527	.....

THE MARKET FOR RUBBER SCRAP.

NEW YORK.

THE MARKET for rubber scrap has continued in the unsatisfactory state that characterized it for the past few months. It might be described as non-existent.

The New York harbor strike, car shortage and the switchmen's strike brought the rubber scrap business to a full stop about the middle of the month. Buyers are so few and sellers so numerous that prices are seriously cut to make sales. Reclaimers are busy but are not active in the scrap market. Dealers have held their prices on shoes unchanged and no change has been noted in tire scrap. Warehouses are filled to overflowing, awaiting a hoped for demand. Lack of foreign shipments is held largely responsible for present scrap values.

The new Atlantic freight rates for waste rubber are thought by traders to be prejudicial to the trade, one merchant stating that they would kill the business, as it would not pay to collect the material when it was burdened with so heavy a charge for shipment.

QUOTATIONS FOR CARLOAD LOTS DELIVERED.

APRIL 26, 1920.

Prices subject to change without notice.

BOOTS AND SHOES:			
Arctic tops	lb.	$0.01 @	
Boots and shoes	lb.	.07½ @	.07⅝
Trimmed arctics	lb.	.05½ @	.05¾
Untrimmed arctics	lb.	.06½ @	.06¾
HARD RUBBER:			
Battery jars, black compound	lb.	.01 @	
No. 1, bright fracture	lb.	.23 @	.24
INNER TUBES:			
No. 1	lb.	.17½ @	.17¾
Compounded	lb.	.09½ @	.10
Red	lb.	.08½ @	.08¾
MECHANICALS:			
Black scrap, mixed, No. 1	lb.	.03½ @	.04
No. 2	lb.	.03 @	
Car springs	lb.	.03½ @	.04
Heels	lb.	.03 @	.03½
Horse-shoe pads	lb.	.03 @	.03½
Hose, air brake	lb.	.04¼ @	
fire, cotton lined	lb.	.01½ @	.01¾
garden	lb.	.01½ @	.01¾
Insulated wire stripping, free from fiber	lb.	.03½ @	.04
Matting	lb.	.01¼ @	.01½
Red packing	lb.	.05½ @	.06
Red scrap, No. 1	lb.	.09 @	.10
No. 2	lb.	.06¾ @	.07¼
White scrap No. 2	lb.	.08 @	.09
No. 1	lb.	.10 @	.11
TIRES:			
PNEUMATIC—			
Auto peelings	lb.	.04½ @	.05
Bicycle	lb.	.02¾ @	.03
Standard white auto	lb.	.04¼ @	.04¼
Standard mixed auto	lb.	.03¾ @	
Stripped, unguaranteed	lb.	.02½ @	.02¾
White, G. & G., M. & W., and U. S.	lb.	.04¾ @	.05
SOLID—			
Carriage	lb.	.04 @	.04¼
Irony	lb.	.01 @	
Truck	lb.	.03¼ @	.03¾

THE MARKET FOR COTTON AND OTHER FABRICS.

NEW YORK.

AMERICAN COTTON. The market continued quiet and very dull, "no sales" being the record for every day save one. The spot price for middling upland cotton was 41.75 cents on April 1. It rose to 42 and 42.50 cents in the second week, to 43 cents the third week, then dropped for a few days, reading 41.45 cents, and on April 27 was 42 cents again.

Planting is late owing to the wet weather and perhaps in some degree to the request of the Government observers, who hope to avert the ravages of the Egyptian pink boll worm, which has made its appearance in Texas and some parts of Louisiana.

EGYPTIAN COTTON. Some business was done in upper Egyptian cotton in the last half of April, mainly on firm offers made by spinners. The upheaval in the Egyptian market, due to the native growers becoming excited over the high prices paid, has continued and limited the amount of business, making it impossible for exporters to send out firm offers. The demand for spot cotton in Alexandria continues, the selection is growing poorer, and those who have it are advised by brokers to put in their orders without delay. Conservative observers believe that the acreage for the new crop will not be increased materially, owing to government restrictions, as the ground is needed for food crops. There is complaint of a deficient water supply but the new crop, though late, is doing well. One result of excessive prices is to drive customers for tire fabrics toward using short-staple cottons instead.

ARIZONA COTTON. The last of this year's crop of Arizona Pima has been sold and only two or three hundred bales are now available. The reports are that a much larger acreage has been planted and that the Arizona cotton may be looked upon to supply the deficiency in Sea Island cotton and to avert excessive prices for the Egyptian long staples.

SEA ISLAND. For the time being the boll weevil has killed the American Sea Island cotton and whatever crop is raised will be so small as to be negligible. Increased production in the West India Islands will have little effect on the deficiency, while the promise of relief from new cotton countries, save in the case of Peruvian mitafifi, is purely speculative.

COTTON FABRICS. The demand for all rubber fabrics continues actively and supplies are very scarce. Prices of ducks, drills, sheetings and raincoat fabrics have advanced. There is no change in the market for tire fabrics as conditions are practically the same as last month.

NEW YORK QUOTATIONS.

APRIL 26, 1920.

Prices subject to change without notice.

ASBESTOS CLOTH:			
Brake lining, 2¼ lbs. sq. yd., brass or copper insertion	lb.	$1.00	@ 1.10
2¼ lbs. sq. yd., brass or copper insertion	lb.	1.10	@ 1.15
BURLAPS:			
32—7-ounce	100 yards	9.50	@
32—8-ounce		9.75	@
40—7½-ounce		10.50	@
40—8-ounce		10.65	@
40—10-ounce		14.25	@
40—10½-ounce		14.50	@
45—7½-ounce		12.25	@
45—8-ounce		12.50	@
48—10-ounce		17.50	@
DRILLS:			
38-inch 2.00-yard	yard	.43½	@
40-inch 2.47-yard		.37½	@
52-inch 1.90-yard		.72½	@
52-inch 1.95-yard		.70½	@
60-inch 1.52-yard		.90¼	@
DUCK:			
CARRIAGE CLOTH:			
38-inch 2.00-yard enameling duck	yard	.45	@
38-inch 1.74-yard		.52½	@
72-inch 16.66-ounce		1.30¼	@
72-inch 17.21-ounce		1.34½	@

MECHANICAL:			
Hose	*pound*	.82	@
Belting		$0.82	@
HOLLANDS, 40-INCH:			
Acme	*yard*		@
Endurance			@
Penn			@
OSNABURGS:			
40-inch 2.35-yard	*yard*	*.35	@
40-inch 2.48-yard		*.33½	@
37½-inch 2.42-yard		*.34	@
RAINCOAT FABRICS:			
COTTON:			
Bombazine 64 x 60	*yard*	.31	@
60 x 48		.29	@
Cashmeres, cotton and wool, 36-inch, tan		1.10	@
Twills 64 x 72		.47	@
64 x 102		.49	@
Twill, mercerized, 36-inch, blue and black		.62½	@
tan and olive		.60	@
Tweed		.90	@ 1.50
printed		.28½	@
Plaids 60 x 48		.30	@
56 x 44		.29	@
Repp		.45	@ .50
Prints 60 x 48		.31	@
64 x 60		.33	@
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES:			
63-inch, 3¼ to 7½ ounces	*yard*	1.45	@ 3.90
36-inch, 2¾ to 5 ounces		.85	@ 2.25
IMPORTED PLAID LINING (UNION AND COTTON:)			
63-inch, 2 to 4 ounces	*yard*	.95	@ 1.90
36-inch, 2 to 4 ounces		.60	@ 1.15
DOMESTIC WORSTED FABRICS:			
36-inch, 4½ to 8 ounces	*yard*	$0.85	@ 1.90
DOMESTIC WOVEN AND PLAID LININGS (COTTON):			
36-inch, 3¾ to 5 ounces		.27	@ .35
SHEETINGS, 40-INCH:			
48 x 48, 2.35-yard	*yard*	.37¼	@
48 x 48, 2.50-yard		.35	@
48 x 48, 2.70-yard		.32½	@
48 x 48, 2.85-yard		.34	@
64 x 68, 3.15-yard		.34½	@
56 x 60, 3.60-yard		.30	@
48 x 44, 3.75-yard		.28	@
SILKS:			
Canton, 38-inch	*yard*	.70	@
Schappe, 36-inch		1.00	@
STOCKINETTES:			
SINGLE THREAD:			
3½ Peeler, carded	*pound*		@
4½ Peeler, carded		1.15	@ 1.15¼
6½ Peeler, combed		1.80	@
DOUBLE THREAD:			
Zero Peeler, carded	*pound*	.98	@ .98½
3½ Peeler, carded		1.04	@ 1.04½
6½ Peeler, combed		2.70¼	@ 2.70½
TIRE FABRICS:			
BUILDING:			
17¼-ounce Sakellarides, combed	*pound*	2.50	@ 2.75
17¼-ounce Egyptian, combed		2.40	@ 2.69
17¼-ounce Egyptian, carded		2.30	@ 2.50
17¼-ounce Peelers, combed		2.30	@ 2.50
17¼-ounce Peelers, carded		1.60	@ 1.75
CHAFER:			
9¼-ounce Sea Island	*pound*	3.00	@
9¼-ounce Egyptian, carded		2.50	@
9¼-ounce Peeler, carded		1.50	@ 1.60

*Nominal.

TIRE
FABRICS

JENCKES
SPINNING
COMPANY

PAWTUCKET
RHODE ISLAND

AKRON OFFICE
407 Peoples Savings & Trust
Co. Building.

EGYPTIAN COTTON CROP MOVEMENT.

FROM AUGUST 1, 1919, TO MARCH 10, 1920.

		1919-1920.	1918-1919.	1917-1918.
To Liverpool	*bales*	233,540	175,878	139,826
Manchester		133,075	86,026	91,116
Other United Kingdom ports		145	5,537	62,879
Total shipments to Great Britain		366,760	267,441	293,821
To France		38,856	33,003	10,309
Spain		8,390	10,140	4,684
Italy		20,750	31,380	22,651
Belgium		320	.....	.....
Switzerland		11,261	12,574	3,350
Holland		666	.....	.....
Portugal		560	.....	.....
Germany		2,167	.....	.....
Austria		9,529	.....	.....
Greece		104	3,713	550
Turkey and other countries		98	.....	.....
Total shipments to Continent		92,701	90,810	41,544
To United States		264,449	33,075	22,543
Japan		15,611	10,534	12,464
Total shipments to all parts		739,521	401,860	370,372
Total crop (interior gross weight), cantars[1]		.....	4,826,342	6,315,841

[1]Cantar equals 98 pounds.
(Compiled by Davies, Benachi & Co.)

PLANTING NOTES FROM BRITISH INDIES.

The Malay peninsula at present is the regulator of the world's rubber output. About 700,000 acres there are planted with rubber trees and the capital invested is $120,000,000. It is likely that the British settlements, Singapore, Penang, Malacca, Wellesley and the Dindings may amalgamate in a few years with the Federated Malay States, Perak, Selangor, Negri Sembilan, and Pahang, as well as the nominally independent native states, Trengganu, Perlis and Kedah, and ask for a certain measure of autonomy. Rubber culture is making their interests practically identical.

In 1918 the area under rubber in Ceylon was increased and new clearings were made in several districts. The exports of rubber, however, fell to 47,219,128 pounds from the 71,351,629 pounds of 1917. This was due to restrictions on shipping to England and on imports into the United States. Members of the Rubber Growers' Association voluntarily restricted their crop outputs and had asked the Government for compulsory restriction, when the armistice was signed.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

NEW YORK.

THE CONDITIONS of active demand and short supply in practically all lines have continued the past month with the situation for the latter half of this time still further complicated as regards deliveries due to the railroad strike, now virtually over.

ANILINE OIL. Urgency of demand during the railroad strike raised spot prices to 38-40 cents per pound.

BARYTES. Car shortage and cessation of freight haulage caused contracts to be withdrawn and new business refused. It will be sometime before normal conditions will prevail with the producers.

BENZOL. The demand has been heavy. Before the strike makers were sold up and the pronounced shortage resulted in sales of 90 per cent at 28-30 cents.

BLACKS. The supply of both carbon and lampblack falls short of meeting the consuming demand.

CARBON BISULPHIDE. The supply is restricted and prices firm.

CARBON TETRACHLORIDE. The price is dependent on that for carbon bisulphide. The unusual demand and short supply resulted in firm prices, which have held steady the entire month.

DRY COLORS. Scarcity of basic chemicals has advanced prices of most dry colors.

LITHARGE. The demand exceeds the supply which has been still further reduced by the railroad strike.

LITHOPONE. Production is entirely sold up to January 1, 1921. The price is strong at 8 cents.

SUBLIMED LEAD. Demand is in excess of the supply. Prices have advanced to 10-10¼ cents.

SULPHUR. Supplies reported ample, demand steady and prices firm.

WHITING. There is promise of an increase of chalk supply soon from England. Until this is effective whiting will be difficult to obtain in large volume.

ZINC OXIDE. The growing active demand followed by decreased production under the influence of the railroad strike may possibly lead to an advance in price.

NEW YORK QUOTATIONS.

APRIL 26, 1920.

Prices subject to change without notice.

ACCELERATORS, ORGANIC.				
Accelerene, New York	lb.	$4.75	@	
Accelemal	lb.	.55	@	.57½
Aldehyde ammonia crystals	lb.	2.25	@	2.50
Aniline oil	lb.	.38	@	
Excellerex	lb.	.65	@	.75
Hexamethylene tetramine (powdered)	lb.	2.50	@	3.50
N. C. C.	lb.	.50	@	
No. 999	lb.	.22½	@	
Paraphenylenediamine	lb.	2.70	@	3.00
Thiocarbanilide	lb.	.55	@	.70
Velosan	lb.	3.85	@	3.95
ACCELERATORS, INORGANIC.				
Lead, dry red (bbls.)	lb.	.12¼	@	
sublimed blue (bbls.)	lb.	.10	@	
sublimed white (bbls.)	lb.	.10	@	
white, basic carbonate (bbls.)	lb.	.10½	@	
Lime, flour	lb.	.02½	@	
Litharge, domestic	lb.	.11¼	@	.12¼
sublimed	lb.	.12	@	
imported	lb.	.11½	@	.12½
Magnesium, carbonate, light technical	lb.	.12	@	.14
calcined extra light	lb.	.60	@	
calcined light	lb.	.35	@	
calcined medium light	lb.	.30	@	
calcined heavy	lb.	.08	@	
calcined commercial (magnesite)	lb.	.04	@	0.05
ACIDS.				
Acetic, 28 per cent (bbls.)	cwt.	3.62½	@	4.37½
glacial, 99 per cent (carboys)	cwt.	15.50	@	16.20
Cresylic (97% straw color) (drums)	gal.	1.10	@	1.20
(95% dark) (drums)	gal.	1.00	@	
Muriatic, 20 degrees	cwt.	2.25	@	2.50
Nitric, 36 degrees	cwt.	6.00	@	6.50
Sulphuric, 66 degrees	ton	24.00	@	25.00
ALKALIES.				
Caustic soda, 76 per cent (bbls.)	lb.	.06¼	@	.07½
Soda ash (bbls.)	lb.	.04	@	
COLORS.				
Black:				
Bone, powdered	lb.	$0.06	@	
granulated	lb.	.11	@	
Carbon black (sacks, factory)	lb.	.12	@	.25
Drop	lb.	.05½	@	.15
Ivory black	lb.	.16	@	.30
Lampblack	lb.	.20	@	
Oil soluble aniline	lb.	1.25	@	
Rubber black	lb.	.08½	@	
Blue:				
Cobalt	lb.	.27	@	.35
Prussian	lb.	.95	@	
Ultramarine	lb.	.18	@	.40
Rubber makers' blue	lb.	3.50	@	
Brown:				
Iron oxide	lb.	.04½	@	.06½
Sienna, Italian, raw and burnt	lb.	.05¼	@	.14
Umber, Turkey, raw and burnt	lb.	.05½	@	.09
Vandyke	lb.	.02½	@	.09½
Green:				
Chrome, light	lb.	.42	@	.65
medium	lb.	.40	@	.65
dark	lb.	.60	@	.70
commercial	lb.	.07	@	.15
Oxide of chromium (casks)	lb.	1.25	@	
Rubber makers' green	lb.	3.50	@	
Red:				
Antimony, crimson, sulphuret of (casks)	lb.	.45	@	.50
crimson, "Mephisto" (casks)	lb.	.60	@	
crimson, "R. M. P."	lb.	.65	@	
Antimony, golden sulphuret of (casks)	lb.	.30	@	.35
golden sulphuret (States)	lb.	.30	@	.35
golden, "Mephisto" (casks)	lb.	.33	@	
golden, "R. M. P."	lb.	.33	@	
red sulphuret (States)	lb.	.25	@	.30
vermilion sulphuret	lb.	.55	@	
Arsenic, red sulphide	lb.	.18	@	
Indian	lb.	.14	@	
Red excelsior	lb.	.18	@	.22
Toluidine toner	lb.	4.25	@	
Iron oxide, reduced grades	lb.	.07	@	.14
pure bright	lb.	.16	@	.17
Spanish bright	lb.	.04¼	@	.05½
Venetian	lb.	.02½	@	.06
Oil soluble aniline, red	lb.	2.00	@	
orange	lb.	1.75	@	
Oximony	lb.	.18	@	
Vermilion, American	lb.	.25	@	.30
artificial	lb.	.37	@	
English quicksilver	lb.	1.65	@	1.75
Rubber makers' red	lb.	3.50	@	
purple	lb.	2.50	@	
White:				
Aluminum bronze, C. P.	lb.	.65	@	
superior	lb.	.69	@	
Lithopone, domestic	lb.	.07¾	@	.08¼
Ponolith (carloads, factory)	lb.		@	
Rubber-makers' white	lb.	.11¼	@	
Zinc oxide, Horsehead (carload, factory):				
"XX red"	lb.	.09½	@	.10
"Special"	lb.		@	
French process, red seal	lb.	.11½	@	.11¾
green seal	lb.		@	
white seal	lb.	.13½	@	.13¾
(States)	lb		@	
Azo (carload, factory):				
ZZZ, lead free	lb.	.09½	@	.09¾
ZZ, under 5% leaded	lb.	.09	@	.09¼
Z, 8-10% leaded	lb.	.08¼	@	.08½
Yellow:				
Cadmium, sulphide, yellow, light, orange	lb.	1.75	@	2.00
red	lb.	1.85	@	
Chrome, light and medium	lb.	.32	@	.35
Ochre, domestic	lb.	.04	@	.07
imported	lb.	.05	@	.08½
Oil, soluble aniline	lb.	2.00	@	
Rubber makers' yellow	lb.	1.50	@	2.50
Zinc chromate	lb.	.45	@	.48
COMPOUNDING INGREDIENTS.				
Aluminum flake (f. o. b. works)	ton	28.00	@	
silicate	ton	28.00	@	35.00
Ammonia carbonate, powdered	lb.	.17¾	@	
Asbestine (carloads)	lb.	.02½	@	
Asbestos (bags)	ton		@	
Barium, carbonate, precipitated	ton	90.00	@	
sulphide, precipitated	lb.	.05	@	
dust	ton	100.00	@	
Barytes, pure white (f. o. b. works)	ton	27.70	@	
off color	ton	16.00	@	
uniform floated	ton	27.70	@	
Basofor	lb.	.05½	@	
Blanc fixe	lb.	.05½	@	
Bone ash	lb.	.10	@	
Carrara filler	ton	25.00	@	
Chalk, precipitated, extra light	lb.	.05	@	.05½
heavy	lb.	.04	@	.04½
China clay, Blue Ridge Dixie	ton	20.00	@	
domestic	ton	18.50	@	20.00
imported	lb.	.03	@	.05
Shawnee	ton	20.00	@	

Cotton linters, clean mill run, f. o. b. factory	lb.	$0.03½	@	.04
Fossil flour (powdered)	lb.	.03	@	
(bolted)	lb.	.03½	@	
Diatomite	lb.	.03	@	.04
Glue, high grade	lb.	.35	@	.40
medium	lb.	.30	@	.35
low grade	lb.	.20	@	.25
Graphite, flake (400-pound bbl.)	lb.	.10	@	.30
amorphous	lb.	.04	@	.08
Ground glass FF. (bbls.)	lb.	.03	@	
Infusorial earth (powdered)	lb.	.03	@	
(bolted)	lb.	.03½	@	
Liquid rubber	lb.	.18	@	
Mica, powdered	lb.	.15	@	
Pumice stone, powdered (bbl.)	lb.	.05	@	.08
Rotten stone, powdered	lb.	.02½	@	.04½
Rubber paste	lb.	.17	@	.22
Rub-R-Glu	lb.		@	
Silex (silica)	ton	25.00	@	40.00
Soapstone, powdered gray	ton	25.00	@	
Starch, powdered corn (carload, bbls.)	cwt.	5.40	@	
(carload, bags)	cwt.	5.12	@	
Talc, powdered soapstone	ton	20.00	@	25.00
Terra blanche	ton	25.00	@	30.00
Tripoli earth, air-floated, cream or rose	ton	50.00	@	
white	ton	52.50	@	
Tyre-lith	ton	90.00	@	
Whiting, Alba (carloads)	cwt.	.80	@	.90
Columbia	cwt.	.80	@	
commercial	cwt.	1.40	@	
English cliffstone	cwt.	2.00	@	
gilders	cwt.	1.45	@	1.55
Paris, white, American	cwt.	1.75	@	
Quaker	ton	16.00	@	
Super	ton	30.00	@	32.50
Wood pulp, imported	lb.	.03¾	@	
XXX	ton	75.00	@	
X	ton	65.00	@	
Wood flour, American	ton	50.00	@	

MINERAL RUBBER.

Elateron	ton	60.00	@	63.00
Gilsonite	lb.	.03¾	@	
Genasco (carloads, factory)	ton	62.50	@	
(less carloads, factory)	ton	64.50	@	
Hard hydrocarbon	ton	35.00	@	
K-X	ton		@	
K. M. R.	ton		@	
M. R. X.	ton	100.00	@	
Pioneer, carload, factory	ton	55.00	@	
less carload, factory	ton	60.00	@	
Raven M. R.	ton	50.00	@	70.00
Refined Elaterite	ton		@	
Richmond	ton	75.00	@	
No. 64	ton	44.00	@	
318/320 M. P. hydrocarbon	ton	50.00	@	
Robertson, M. R. Special (carloads, factory)	ton	80.00	@	
M. R. (carloads, factory)	ton	57.50	@	
M. R. (less car loads factory)	ton	60.00	@	
Walpole rubber flux (factory)	lb.	.05	@	

OILS.

Avoilas compound	lb.	.16	@	.18
Castor, No. 1, U. S. P.	lb.	.21	@	
No. 3, U. S. P.	lb.	.20	@	
Corn, refined Argo	cwt.	20.06	@	
Cotton	lb.	.20	@	
Glycerine (98 per cent)	lb.	.23½	@	.24
Linseed, raw (carloads)	gal.	1.79	@	1.84
Linseed compound	gal.	.85	@	
Palm (Lagos)	lb.	.16	@	
Peanut	lb.	.25	@	
Petrolatum	lb.	.10	@	
Petroleum grease	lb.	.07½	@	.09
Pine, steam distilled	gal.	1.65	@	1.75
Rapeseed, refined	lb.	.22	@	
blown	lb.	.22	@	
Rosin	gal.	.70	@	1.05
Soya bean	lb.	.18	@	
Tar	gal.	.38	@	.40

RESINS AND PITCHES.

Balsam, fir	gal.	1.75	@	1.80
Cantella gum	lb.	.55	@	
Cumar resin, hard	lb.	.12	@	.16
soft	lb.	.09	@	.13
Tar, retort	bbl.	15.50	@	
kiln	bbl.	14.50	@	
Pitch, Burgundy	lb.	.10	@	
coal tar	lb.	.01	@	
pine tar	lb.	.04	@	
ponto	lb.	.14	@	
Rosin	bbl.	16.95	@	21.75
granulated	lb.		None	
fused			None	
Rosin, K	bbl.	23.00	@	
strained	bbl.	18.50	@	
Shellac, fine orange	lb.	1.75	@	

SOLVENTS.

Acetone (98.99 per cent drums)	lb.	.23	@	
methyl (drums)	gal.	1.50	@	
Benzol, water white	gal.	.30½	@	.33½
Beta-naphthol	lb.	.90	@	
Carbon bisulphide (drums)	lb.	$0.07½	@	.08¼
tetrachloride (drums)	lb.	.12	@	.14½
Naphtha, motor gasoline (steel bbls.)	gal.	.28½	@	
72 @ 76 degrees (steel bbls.)	gal.	.38½	@	
70 @ 72 (steel bbls.)	gal.	.36½	@	
68 @ 70 degrees (steel bbls.)	gal.	.35½	@	
V. M. & P. (steel bbls.)	gal.	.27½	@	
Toluol, pure	gal.	.33½	@	.36½
Turpentine, spirits	gal.	2.65	@	
wood	gal.	1.60	@	
Osmaco reducer	gal.	.50	@	
Xylol, pure	gal.	.37	@	.45
commercial	gal.	.35	@	.40

SUBSTITUTES.

Black	lb.	.10	@	.21
White	lb.	.11	@	.24
Brown	lb.	.15	@	.24
Brown factice	lb.	.10	@	.22
White factice	lb.	.16	@	.25
Paragol, soft and medium (carloads)	cwt.	18.58	@	
hard	cwt.	18.08	@	

VULCANIZING INGREDIENTS.

Lead, black hyposulphite (Black Hypo)	lb.	.39	@	
Orange mineral, domestic	lb.	.15¼	@	
Sulphur chloride (drums)	lb.	.20	@	
Sulphur, flour, Brooklyn brand (carloads)	cwt.	3.40	@	
Bergenport brand (carloads)	cwt.	3.40	@	
superfine (carloads, factory)	cwt.	2.00	@	2.25

(See also Colors—Antimony.)

WAXES.

Wax, beeswax, white	lb.	.70	@	
ceresin, white	lb.	.18	@	
carnauba	lb.	.50	@	
ozokerite, black	lb.	.60	@	
green	lb.	.60	@	
Montan	lb.	.30	@	
paraffine, refined 118/120 m. p. (cases)	lb.	.11	@	
123/125 m. p. (cases)	lb.	.12	@	
128/130 m. p. (cases)	lb.	.13½	@	

HEVEA PLANTING IN BELGIAN CONGO.

A systematic effort to establish *Hevea* plantations in the Belgian Congo Colony on a scientific and practical foundation, as has been done in Malaya, is being made at Yangambi, near Stanleyville, on the river Congo. A committee which examined conditions has reported in the *"Bulletin Agricole du Congo Belge."* Planting was begun in 1911, when 11,431 trees were set out on a little over 115 acres of ground; two years later 26,750 more trees were planted on 326 and a fraction acres, making a total of 38,191 trees on 441½ acres of land. The trees are planted nearly 22 feet apart or 82½ to an acre.

All that relates to rubber cultivation was studied: the general conditions of growth, the care of the trees, the manner of tapping, the rubber crop and output, the treatment of the product, the by-crops, such as coffee, the enemies and diseases of *Hevea*, the provision for water and the measures to modulate the rainfall.

It seems that the reputation of Belgian Congo rubber is not very favorable in Europe; there need be less justification for this hereafter. The conditions found in Yangambi, such as good climate, the right kind of soil and suitable facilities for exportation to foreign lands, give promise of as successful results as in Malaya, Java and Sumatra, if the same methods are used as in those countries. Too great profits must not be expected at the beginning and modern methods must be employed.

Belgian Congo has a great advantage over the Far Eastern plantations in that labor is cheaper there than in the Indies, and the experience of the Yangambi plantations has shown, moreover, that the labor is not only useful for rubber culture but skilled in it. Some contract laborers are needed at first to teach the delicate and accurate work requisite in tapping for the latex; but the labor question seems to be one that is easily settled on the Congo, and the future of *Hevea* culture there seems to be by no means unfavorable.

"CRUDE RUBBER AND COMPOUNDING INGREDIENTS" AND "RUBBER MACHINERY," by Henry C. Pearson, should be in the library of every progressive rubber man.

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TABLE OF CONTENTS.

	Pages
Editorials:	
The Metric Menace	479
What Machinery Has Done for Rubber	479-480
Looking Ahead in Crude Rubber	480
The Factory Training School	480
Rubber Patent Leather Wanted	480
Minor Editorials	480
The Metric System Applied to the Rubber Industry. By C. C. Stutz—Chart	481-485
Rubber Balls Brand Walnuts—Illustrated	485
Rubber Creations for Moving Pictures—Illustrated	486-487
Stabilizing Southwest Cotton Industry. Portrait of Thomas W. McDevitt	488
Prices of Cotton and Cotton Products—Charts	489-494
Cotton in British Africa—Illustrated	494
Chemistry:	
What the Rubber Chemists Are Doing—Extraction of Rubber Goods. Synthetic Rubber of German Manufacture. Cumar Resin. Variability of Cure of Slab Rubber. Synthetic Acetic Acid as a Latex Coagulant. Lead Oleate.	495-496
Chemical Patents	497
Laboratory Apparatus—Illustrated	497
American Chemical Society—Rubber Division Meeting	498-499
Jar Rings and Poisoned Olives	499
Machines and Appliances—Illustrated. Improved Clicking Machines. A New Enclosed Mixing Machine. Automatic Machine for Weighing Rubber Ingredients. Peerless Duplex Hacksaw Blades. Magnetic Chucks. Portable Elevator or Piling Machine. A Disk Type Friction Clutch.	500-502
Machinery Patents—Illustrated. Machine for Making Storage Battery Separators. Other Machinery Patents.	502
Process Patents	502
New Goods and Specialties—Illustrated. A British Rubber Hat. Bathing Caps of the Season. A Brush for the Hands and Nails. Pocket Hair Brush and Mirror. The "Erie Cord" Tire. Ludington Armored Pneumatic Tire. Rubber-Soled Bathing Shoe. A New Three-in-One Tire. Gas or Smoke Mask. Expanding and Contracting Stopper. A Silver Anniversary Cord Tire. Novel Sub-Tire. Rubber Suit and Safety Goggles.	503-504
The Salvaging of Truck Tires by the Army. Illustrated	505
The Right and Wrong of a Blow-Out Repair. Illustrated	505
The Obituary Record. Theodore N. Vail (Portrait). Professor Karl Dieterich, Ph.D.	506
Interesting Letters from Our Readers. Rubber and Metallic Substances Applied to Cloth. Special Library Census. On Expansion of Rubber Compounds During Vulcanization. C. W. Sanderson's Reply.	507-508
Editor's Book Table. "A Table of Tensile Strengths of Rubber." "The Metric Fallacy." "Inorganic Chemical Synonyms and Other Useful Chemical Data." "Industrial Chemistry."	508
New Trade Publications	508-509
Inquiries and Trade Opportunities	509
Judicial Decisions	509
Diamond Fiber for Rubber Working Equipment. Illustrated	510
United States Rubber Co., Annual Report of	511-512
The Bunsen Burner in Rubber Repair. By Arthur C. Squires—Illustrated	513
Aluminum in the Rubber Industry—Illustrated	513-514
American Rubber Trade—News Notes and Personals	515-528
Financial Notes	515
Dividends	515
New Incorporations	516
Joseph E. Mayl—Portrait and Sketch	516
Charles Schweinert—Portrait and Sketch	517
Intercontinental Rubber Co.—Statement and Balance Sheet of	517
United States Tire Promotes Sales Executives	518
George R. Loggie—Portrait and Sketch	519
C. Kenyon Co.'s Plants—Illustrated	520
George W. Sherman—Portrait and Sketch	520
L. G. Fairbank—Portrait and Sketch	524
Eastern and Southern Notes. By Our Correspondent	521
New Jersey—By Our Correspondent	521-522
Rhode Island—By Our Correspondent	522-523
Massachusetts—By Our Correspondent	523-524
Akron, Ohio—By Our Correspondent—Illustrated	524-526
Mid-Western Notes. By Our Correspondent—Illustrated	526
Pacific Coast Notes. By Our Correspondent—Illustrated	527-528
Canadian Notes	528
Mid-West Rubber Manufacturers' Association, April Meeting	526
Billiard Accessories of Rubber—Illustrated	529
The Rubber Association of America—Activities of	530-531
Foreign Rubber News:	
Great Britain—By Our Correspondent	532-533
Italy's Rubber Industry. By H. C. McLean—Illustrated	534
Planting:	
Rubber Planting in Kamerun. By Alfred Dominikus—Illustrated	535-536
African Notes	536
Singapore Gutta Percha Exports	536
Pneumatic Tread Designs Registered December, 1916, to September, 1917—Illustrated	537
Patents Relating to Rubber—United States. Canada. United Kingdom. New Zealand. Australia. France. Germany.	538-539
Trade Marks—United States. Canada. United Kingdom. Australia. New Zealand.	539-540
Designs—Illustrated. United States. Canada.	540
The Future of the Rubber Market	545-546
Markets:	
Crude Rubber	541
Highest and Lowest New York Prices	541
Amsterdam Rubber Market	542
Antwerp Rubber Market	542
Batavia Rubber Market	542
Reclaimed Rubber	541
Rubber Scrap	550
Cotton and Other Fabrics	550-551
Chemicals and Ingredients	552-553
Statistics:	
Canada, Statistics for January, 1920	549-550
Ceylon Rubber Imports and Exports	542
Cotton Statistics	552
Deli (Sumatra) Rubber Exports	542
French Indo-China Rubber Exports	542
Federated Malay States Rubber Exports	542
Italy, Statistics for October, 1919	547
Java Rubber Exports	542
Straits Settlements Rubber Exports	542
United Kingdom, Statistics for February, 1920	547
United States:	
Crude Rubber Arrivals at Atlantic and Pacific Ports as Stated by Ships' Manifests	543-545
Imports by Months for 1920	542
Plantation Rubber Imports by Ports, 1919	542
Exports of India Rubber Manufactures During February, 1920 (By Countries)	548-549